The role of communication in encouraging sustainable behaviour

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Abstract

This aim of this thesis is to contribute to the debate about the best approach to engage citizens with sustainable behaviour. It is generally agreed that 'bottom-up' approaches, where individuals are actively involved, are more effective than 'top-down' authority-led projects where they have a more passive role. There is, however, a dearth of evidence from comparative evaluations. This thesis examines six distinct communication activities aimed at encouraging individuals to adopt more sustainable behaviours. Each used a different approach, some participative and others more top-down informational.

Two questionnaires were used to gather data. The first was conducted at the time of the activity; the second between four and five weeks later and included questions about behaviour change.

Variables from Petty and Cacioppo's Elaboration Likelihood Model (ELM), such as perceptions about a message and its source, and variables which Ajzen's Theory of Planned Behaviour (TPB) proposes as being key to behaviour change, such as subjective norms and attitudes, were used to see if these identified any difference in outcome.

Findings indicate support for the added value of a bottom-up approach compared to other mechanisms and identify that this may be partly explained by the extent to which such activities offer a more supportive environment for behaviour change to take place. The measures used in this study may be useful to others seeking to evaluate behaviour change communication campaigns or those comparing different communicative approaches.

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Abbreviations and acronyms

A21	Action 21
A21 Peace	Action 21 Peace Festival
A21 REC	Action 21 Renewable Energy Club
AP	Ability to process (ELM variable)
ATT	Attitude (TPB variable)
AQ	Argument quality (ELM variable)
AYDYB	Are You Doing Your Bit
COI	Central Office of Information
DCLG	Department for Communities and Local Government
DECC	Department of Energy and Climate Change
Defra	Department for Food, Environment and Rural Affairs
DV	Dependent variable
ELM	Elaboration Likelihood Model
ESB	Environmentally significant behaviour
INTELAB	Intention to elaborate (TPB variable)
INV	Involvement (ELM variable)
IV	Independent variable
PBC	Perceived behavioural control (TPB variable)
POSTELAB	Post-elaboration behaviour (DV for TPB and ELM)
RPII	Revised Personal Involvement Inventory
SC	Source credibility (ELM variable)
SIO	Switch it Off
SIO bags	Switch it Off bag handout
SIO media	Switch it Off media readers
SIO vols	Switch it Off volunteers
SIO univ	Switch it Off Universally Challenged
SN	Subjective norm (TPB variable)
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TV	Television
WCC	Warwickshire County Council
UK	United Kingdom

1 Introduction

> *Consumer behaviour is key to the impact that society has on the environment. The actions that people take and choices they make – to consume certain products and services or to live in certain ways rather than others – all have direct and indirect impacts on the environment, as well as on personal (and collective) well-being. This is why the topic of 'sustainable consumption' has become a central focus for national and international policy*. (Jackson, 2005, p. iii)

In 2005 Professor Tim Jackson produced a review of evidence on consumer behaviour and behavioural change in the context of achieving sustainable development. Along with similar documents published in this period (Anable, Lane, & Kelay, 2006; Collins *et al.*, 2003; Darnton, 2004; Halpern *et al.*, 2004) it typifies a search for answers about how to engage people in the United Kingdom (UK) in the type of behaviours necessary to achieve a more sustainable society. Flaws in the current models for engaging people with the issues, particularly in the concentration on the use of public information, or communication, campaigns were highlighted in all of these reports.

Criticisms included the complaint that such campaigns, as current at the time, tended to instruct rather than engage people in finding solutions, tended to work less well than other forms of learning, and failed to accommodate situations where people did not respond rationally to information (Jackson, 2005). Anable *et al.* (2006, p. 2) proposed that "deliberative methodologies" rather than "top down" methods of information provision needed to be provided. Collins *et al.* (2003) also called for more community focus in campaigns and Halpern *et al.* (2004) advocated the potential effectiveness of seeking behaviour change not only through a focus on individuals but by investigating the impact of the behaviour of significant figures (such as parents and peers) around them. Darnton (2004) argued that factors other than simple awareness, or knowledge gain, needed to be addressed as it was often not the provision of information that had the most impact on behaviour. He also argued for policy-makers to recognise and confront the limitation of information-based programmes and acknowledge that consumption decisions are not always made in a linear way, with consumers receiving information, engaging cognitively with it and then altering behaviour. Collins *et al.* (2003) agreed that policy-makers put too much faith in the power of communication campaigns. Anable *et al.* (2006) called for more tailoring of communication campaigns to meet the psychological needs and motivations of the target audience as a means to boost effectiveness.

This cocktail of problems identified with communication campaigns is significant because rationally-based mass audience appeals are a key policy tool. Jackson points out that these types of campaigns represent one of the two main avenues used by policymakers in the UK to encourage sustainable behaviour (2005), the other being to influence the costs and benefits to the individual of targeted behaviours.

A recent example of the communication approach to behaviour change is 'Act on CO_2', which attempts to "increase awareness and understanding of the relationship between climate change and CO_2 and encourage genuine sustained behaviour change" at a cost of £5.5 million per annum (Hansard, 2008). The Central Office of Information (COI) is the Government's communication agency, and its annual accounts for 2009/10 listed spending of £532 million, with advertising the largest component and accounting for £213 million of that figure (COI, 2010). It is not compulsory for government departments to use the COI and it has been estimated that these figures represent the expenditure for about half of all Government campaigns (Cartmell & Mattinson, 2010). It also does not include the behaviour change communication work of organisations such as the Energy Saving Trust, Carbon Trust, WRAP (Waste & Resources Action Programme) and a host of other publicly funded organisations who use campaigns to change behaviour. Nor does it include local government in England, which also has powers and responsibilities awarded by the Department for Communities and Local Government to encourage behaviour that mitigates climate change (DCLG, 2006, 2008).

As communication campaigns are a widely used and cost-incurring mechanism to tackle unsustainable behaviour, it follows that research which provides information about the effects they do have is of value. This is particularly so at a time when scrutinising the effectiveness of communication has risen high on the Government agenda (COI, 2010). Part of the drive to improve the effectiveness of Government-sponsored communication has included the recent decision to close down the COI[1].

The broad aim of this thesis is to explore in depth a set of communication activities which vary from traditional to non-traditional in their approach. Its intention is to contribute to the evidence gap over whether bottom-up methods do, as asserted by Anable *et al.* (2006) and Collins *et al.* (2003), offer a better way to change behaviour than top-down approaches. It will conduct the assessment using persuasion theory, which Jackson (2005) argues has

[1] www.prweek.com/uk/News/MostRead/1076599/Cabinet-Office-close-COI-hand-campaigns-back-departments/ accessed June 27, 2011

salutary lessons for public sector information campaigns. It will also use behavioural theory, which Halpern *et al.* (2004) argue would improve information and advertising campaigns.

As Jackson (2005, p. 133) summarises, research is required to ascertain the level of behaviour change delivered and which forms of intervention work best:

> *What is missing from this evidence base, at present, is unequivocal proof that community-based initiatives can achieve the level of behavioural change necessary to meet environmental and social objectives. There is simply not enough experience across enough areas and covering all the relevant parameters to determine precisely what form such initiatives should take...*

The rest of this chapter sets out the scientific and policy context for the research reported in this thesis, outlining the current status of the issue in the UK, defining the behaviours to be addressed and outlining the role of communications in delivering change. The broad aim set involves assumptions that persuading people to change their behaviour in the interests of achieving a more sustainable society is both worthwhile and ethical. This chapter also addresses the epistemological approach underpinning this research. The chapter will close with a brief summary of the content of each subsequent chapter.

1.1 Climate change – current position

1.1.1 UK political engagement

The most recent report from the Intergovernmental Panel on Climate Change (IPCC, 2007) confirms that concentrations of carbon dioxide in the atmosphere far exceed the natural range, and that this is explained by fossil fuel use and land use change. The UK has been signatory to international efforts to address problems of sustainable development and specifically the pressing problem of climate change as these have emerged as international issues of concern. It was one of many countries to sign up to the agreements which emerged from the UN Conference on Environment and Development held in Rio de Janeiro in 1992, which included a Framework Convention on Climate Change (Dresner, 2002). Many countries, including the UK, went on to bolster the aspirations in the framework convention by agreeing binding targets in the Kyoto Protocol of 1997 to achieve an average 5.2% reduction in emissions of the main greenhouse gases in the period 2008-12 compared with 1990 levels. A Conference of the Parties (COP) to the framework convention meets regularly to assess progress (ibid).

The UK was also signatory to the World Summit on Sustainable Development in Johannesburg held on the tenth anniversary of the Rio conference and shortly afterwards published Changing Patterns, the UK's framework for Sustainable Consumption and Production (Defra, 2003; Jackson, 2005). This in turn influenced the 2005 publication of the UK Government strategy for sustainable development (Defra, 2005a)[2], in which it identified dealing with climate change and achieving sustainable consumption as priorities.

The strategy included "a new push to influence consumption patterns, including proposals for new advice for consumers." (ibid, p. 8) and it identified as behaviours to target those associated with household energy and water consumption, food consumption, travel and tourism. A government-funded report on sustainable consumption (SCR, 2006) followed, which criticised a fragmented range of bodies and initiatives charged with encouraging behaviour change, including the Energy Savings Trust, Consumer Council for Water, Waste and Resources Action Programme (WRAP), the Environment Agency, Environment Direct and the climate change communications programme of the Department for Environment, Food and Rural Affairs (Defra). It concluded the Government should work harder with local authorities to 'lever up' (ibid, p. 53) community action, recycling levels and energy conservation.

The Department of Energy and Climate Change (DECC) was created in 2008 but Defra retained policy responsibility for public behaviour change (Defra, 2010a). A new UK Government took office on 11 May, 2010 and while it is not yet clear how voluntary behaviour change to mitigate climate change will be prioritised, responsibility for engaging local communities will be handled by local government (Defra, 2010b). Tackling climate change is already a pressing concern for local government, with every council set a target to either reduce the carbon emission of its own operations or a more challenging target of reducing the emissions of the whole local authority area (DCLG, 2007). This has made climate change a pressing concern for local authorities (Improvement and Development Agency, 2009).

1.1.2 UK popular engagement

Research in 2001 indicated that most people in the UK were aware of climate change, global warming and the greenhouse effect (Defra, 2002). In an updated survey in 2009,

[2] Devolved administrations produced their own documents for Scotland, Wales and Northern Ireland.

96% of those surveyed identified at least one or two actions they took in their daily lives as being "environmentally friendly" (Thornton, 2009).

Spence *et al.* (2010) investigated whether the long-term trend in concern about climate change may have peaked. With a sample of 1822 participants they found that 66% of their respondents tended to agree or strongly agree that there were risks to people in Britain from climate change, and 71% were either fairly or very concerned about climate change. Both of these figures were down 11 percentage points compared to a similar survey conducted in 2005. In the same survey (Spence *et al.*, 2010) respondents were asked new questions about behaviours. Sixty three percent agreed or strongly agreed that changing their behaviour would help reduce climate change, and 65% gave the same positive responses to being prepared to reduce personal energy use to tackle climate change[3].

These survey questions give information about awareness, concern and preparedness to act. The distinction between knowing and acting is emphasised by Lorenzoni, Nicholson-Cole and Whitmarsh (2007). They define engagement as more than being aware: "it is not enough for people to know about climate change in order to be engaged; they also need to care about it, be motivated and take action" (p. 446). They define engagement as more than a process in which people take part; it is a personal state of connection involving evidence of cognitive, affective and behavioural impacts with an issue. These three defining characteristics of engagement are explained further by Ajzen (2005), with cognitive impact operationalized as responses that reflect perceptions and thoughts about an issue, affective impacts as emotional and conative responses such as intentions, commitments and actions related to the issue. The way in which the study reported in this thesis defines and operationalizes these issues is discussed in more detail in Chapters Four and Five.

1.1.3 Driving popular engagement

The impact of the difference between being aware and taking action is highlighted by a study for the UK Department of Environment, Food and Rural Affairs (Defra, 2008). It found there were big differences in levels of engagement for different environmental behaviours. Even within one type of activity, small habitual energy behaviours within the home, the survey found wide variation in responses and between activities. For instance

[3] Surveys in this thesis were conducted from June 2008 to March 2009 so the 2005 and 2010 figures act as 'bookend' indicators to the attitudes likely to be held by residents in Britain at that time.

nearly two thirds of respondents said they never left their TV on standby overnight, but a fifth said they always left it on standby overnight.

The same study identified behaviours by two criteria, the willingness of people to engage and the impact of the behaviour on carbon emissions. Avoidance of short haul flights for example, was identified as a type of behaviour with a high carbon reduction impact, but low willingness to act. As a result the report recommended programmes to motivate sustainable consumption designed around behaviours where there was found to be a willingness to act.

The Defra report (2008) identified environmentally significant behaviours (ESBs) as those which have an impact on the environment, specifically with regard to climate change. Stern (2000) agrees that ESBs should be defined by their impact; the extent to which they alter available levels of materials or energy in the environment, or impact on the earth's ecosystems or the biosphere. There is a distinction between impact-orientated and intention-orientated behaviours in that the latter are based on peoples' beliefs but may not, in fact, have positive environmental consequences. Stern favours concentrating on impact-orientated behaviours, arguing these make the largest differences.

Stern (2000) also argues that there are two broad types of ESB. Public sphere behaviours include environmental activism, non-activist support of activism and attempting to influence others to improve their ESBs. Private-sphere behaviours, where a person attends to their own behaviours such as personal use of energy and travel habits, are the type relevant to the study in this thesis. The distinction between the two types of behaviour is important, Stern advises, because the different types of behaviours have different social-psychological predictors associated with them. Private sphere behaviours tend to vary depending on the person, the behaviour and the context, with context becoming more predictive of behaviour than a person's social-psychological predisposition when contextual constraints were large (such as difficult, time-consuming or expensive).

The Defra (2008) and Stern (2000) papers offer slightly different but, it is argued here, complementary advice. Defra advocates concentrating on behaviours where there is willingness to act and Stern advises concentrating on behaviours which are not overwhelmingly constrained. A campaign providing information aimed to promote cognitive processing is more likely to be effective if directed at those behaviours which are not overwhelmingly constrained by contextual factors as this is also more likely to be matched by willingness to act (for instance, if train travel abroad were cheaper and quicker than flying, more people might be persuaded to take the train). Selection according to

willingness to act was not a feature in this study but it is a factor to be considered when assessing results (see Chapter Six, section 6.1).

Abrahamse *et al.* (2005) further divide the types of actions which could be described as private-sphere behaviours. They describe "efficiency" behaviours as one-shot type actions which produce ongoing savings, such as installing loft insulation. "Curtailment" behaviours are those which involve repetitive efforts such as turning off lights (p. 274). The behaviours which are the subject of the communication activities studied in this thesis accommodate capturing both of these two types.

1.2 Tools to drive environmentally significant behaviours

As indicated in the opening paragraphs of this chapter, communication is one of the main tools used by policymakers to influence how citizens approach ESBs. However, there are other options and in this section communication is compared against these in order to learn why it is often chosen as the most appropriate tool to encourage ESB change.

Table 1.1. Policy tools used to encourage ESB take-up

Publication	**Tools available to policymakers**		
Paisley (2003)	Engineering	Education	Enforcement
Collins *et al.* (2003)		Information provision Marketing strategies	Legislation Economic instruments
(Dahlbom *et al.*, 2009)	Infrastructure changes (e.g. speed bumps)	Communication	Regulation Economic drivers
(Pawson, 2003)		Sermons (communication)	Carrots (e.g. grants and subsidies) Sticks (e.g. regulation)
(Defra, 2005b)	Enable (e.g. remove barriers)	Engage (e.g. media campaigns) Exemplify (e.g. lead by example)	Encourage (e.g. tax)

As can be seen in Table 1.1, Paisley (2001) offers engineering, education, and enforcement as mechanisms to encourage behaviour change, and many of the subsequent reviews or typologies fall into similar broad categories. Collins *et al.* (2003, p. 3) focus on the enforcement and education routes, further separating the latter into provision of information, and marketing strategies that try to "win hearts and minds so that the right behaviour follows". This is reminiscent of an earlier distinction between techniques which are purely informational and those which are more motivational (De Young, 1993). At the conclusion of a European Union funded study of more than forty behaviour change projects, Dahlbom *et al.* (2009) defined four available measures, and Pawson (2003) neatly defines available policy mechanisms as carrots, sticks and sermons. The UK Government strategy

for sustainable development also uses the thematic approach, saying that it will "enable, encourage and engage people and communities in the move toward sustainability" whilst itself exemplifying, or leading by example (Defra, 2005b, p. 26). The four themes can cross-over with, for instance Paisley's (2001) mechanisms because enabling strategies could involve removing barriers, by giving information and educating. Encouragement could include using taxation or applying social pressure using league tables.

As Halpern *et al.* (2004) point out, the focus of the choice of policy is to reach a point where there is no requirement to spend money on prevention or enforcement because new habits and behaviours become a self-sustaining social norm. The reason for communication to be preferred to achieve this position is offered by Paisley (2001); engineering would be the optimum choice if quick and non-costly, but this is often not the case, while enforcement is described as the final and usually unpopular mechanism. Salmon (1989) explains that communication campaigns are often cheaper and importantly a less restrictive alternative to other policy interventions, although acknowledges that all are using social control to curtail individual freedoms.

Abrahamse *et al.* (2005) pragmatically argue that policy tool choices fit certain types of behaviour better than others. Behaviours that are affected by contextual issues above the level of the individual might be better suited to an engineering solution. Behaviours that are more heavily influenced by individual-level factors, such as personal preferences, are more suited to being targeted by a communication campaign to encourage voluntary behaviour change.

This typology of policy tools has focused on individuals or groups within society largely seen as consumers performing what Stern (2000) earlier identified as private-sphere behaviours and this matches the focus of the study reported in this thesis. It is acknowledged that the individual also has a potential role as an active citizen (Blake, 1999; Crompton & Thogersen, 2009) and that similar encouragement could usefully be targeted at engaging people to take part in public sphere behaviours (Kennedy *et al.*, 2009; Shove, 2009).

1.3 Communication and climate change

Having identified that communication is a key tool in the encouragement of ESBs, this section will examine in more detail the nature of communication and look at some arguments for why it operates imperfectly. The purpose of this will be to identify which of these issues will fall within the scope of this thesis.

Rice and Atkin (2002) define public communication campaigns as purposeful attempts to inform, persuade or motivate behaviour change. Other features include a relatively large and well-defined audience, non-commercial benefits accruing from the campaign to society, the campaign to run over a given time period and to feature mass media communication often backed up by interpersonal support. Hardeman *et al.* (2002) agree that persuasive communication is explicitly designed to encourage a desired behaviour. Devine and Hirt (1989, p. 230) define information campaigns as "organised attempts to influence another's beliefs about, attitudes toward, and/or behaviours with respect to some object (e.g. product, issue, person, etc.) through the use of mass media or other communication channels". In 2009 the Central Office of Information produced a resource to help public sector communicators improve behaviour change communication. It acknowledged that "the starting point for effective communications should be a deep understanding of human behaviour and how to change it" (COI, 2009, p. 59).

Public communication promotes knowledge, and knowledge is reliably found to have the strongest relationship to environmental behaviour change of all variables assessed (Schultz, 2002), with a consistent pattern shown for a range of behaviours such as condom use, cigarette smoking, substance abuse and energy conservation. Information is also identified strongly as a causal variable by Stern (2000) and a review by Baesler and Burgoon (1994) documented a range of successful examples of information use leading to persuasion. However, these authors also point to examples where information has failed to provide evidence of impact, and others have appeared in the literature since their review (e.g.McGuire, 2001; Poiesz & Robben, 1996; Updegraff *et al.*, 2007).

According to Fishbein and Azjen (1981), one reason communication and persuasion research has not made more progress in demonstrating effectiveness at delivering behaviour change is that examination of the nature of the information making up the persuasion is too often neglected. Bator and Cialdini (2000) also point out that it is how the individual processes information that determines the effectiveness of persuasion attempts.

1.3.1 Concerns about the efficacy of climate change communication

As acknowledged in the introduction to this chapter, despite its successes, concerns have been raised about the ability of mass communication campaigns to deliver attitudinal and behavioural change. A review of the problems associated with ESB communication campaigns in recent policy literature is summarised in Table 1.2. It is used to map out which issues are a key focus, and which are not a feature of the study. Some issues are

accepted as being relevant, but not focal to, the study undertaken in this thesis and are dealt with more briefly in this chapter.

The next section will briefly discuss those items which are relevant to but not a direct focus of this thesis. The following section will outline what issues *are* core to this thesis, and provide an outline of the content of each chapter.

1.3.1.1 Making assumptions about rational choice

(Problem 3, Table 1.2)

Jackson (2005) argues that a model of 'rational choice' guides much existing policy aimed at motivating sustainable consumption. Rational choice assumes decisions, such as those about consumption, are made as a result of weighing up facts about all consequences and outcomes of choices (March & Heath, 1994). As March and Heath point out, 'pure' rational decisions are rare; frequently all information simply can't be known, especially about consequences. Decision-making also requires attention, memory, comprehension and is reliant on the quality of communication received. Rational choice also says nothing about the role of emotion (Jackson, 2005) and social pressures to behave appropriately (March & Heath, 1994). Social psychology theory can accommodate some of these additional factors influencing behaviour. Ajzen's Theory of Planned Behaviour (1991; 2005) for instance, states that behaviour is a function of more than just the expected value of performing a particular behaviour, but also norms and control factors. The theory underpins the study reported in this thesis and is outlined in more detail in Chapter Five.

Table 1.2. Problems with ESB communication and mapping of discussion in this thesis

No.	Problem identified	How addressed
1.	Campaigns tend to instruct rather than engage people in finding solutions (Jackson, 2005) and such top-down, authority-led methods are less effective than bottom-up deliberation (Anable *et al.*, 2006).	A central feature of this thesis, discussed in detail in Chapter Two.
2.	Campaigns work less well than other forms of learning (Jackson, 2005).	Not a core feature of the study. Hardeman *et al.* (2002) discuss that social learning has most potential when participants have already established an intention to change behaviour, which is not the focus of this study.
3.	People do not always respond rationally to information (Jackson, 2005).	This is discussed in this chapter, section 1.3.1.1.
4.	Linear models assume a sequence of events – that knowledge leads to action and action affects behaviour. Alternatively, it is quite possible for altered attitudes to follow as a result of trying a new behaviour. Linear models do not offer the only explanation of behaviour change (Darnton, 2004).	Behaviour is not always predicted by linear models, but such a model is justified in this study because it maps the linear intention of the communication activities being studied. Theories appropriate to track the impact of information are discussed in more detail in Chapter Five.
5.	Even when linear models are found to explain behaviour, it is argued that there is an information-deficit in that raised awareness is not matched by equal levels of raised action (Darnton, 2004).	The gap between knowledge and behaviour is discussed in section 1.3.1.2 of this chapter.
6.	Campaigns should investigate the impact of the behaviour of significant 'others' such as parents or peers (Halpern *et al.*, 2004).	The use of the Theory of Planned Behaviour (Ajzen, 1991, 2005)[4] and the variable 'subjective norm' in this study responds to this call and is discussed in Chapter Five.
7.	Collins *et al.* (2003) called for more community focus in campaigns.	This is not explicitly evaluated in this study but the community-level nature of the activities studied is discussed in Chapter Four, when the study sites are described. It is also discussed in section 1.3.1.3 of this chapter.
8.	Anable *et al.* (2006) call for the psychological needs and motivations of the target audience to be met.	Psychological theory was used to track the impact of the campaign but not in its design. The thinking used by the campaign designers is discussed in Chapter Four. A reflection on whether it would have been useful to use psychological theory at the design stage is included in Chapter Seven.

[4] The frequently cited 1988 description of the model was reproduced in a second edition in 2005.

1.3.1.2 The value action gap

(Problem 5, Table 1.2)

The gap between what people know about a problem and the action they take has been explored in several studies, with a range of barriers identified to prevent implementation of a simple linear model in which provision of information would fully explain change in behaviour. Blake (1999) identified three sets of barriers: individuality, which included attitude and motivation; responsibility, which included perceptions of what others were doing and social norms about what was appropriate; and practicality, such as external constraints like cost and infrastructure. Kollmus and Agyeman (2002) identified two groups of constraints or barriers: external factors such as whether infrastructure exists to support action or the action is costly, and factors internal to the individual, such as perceived cultural norms, motivations, values, attitudes and emotional involvement. Lorenzoni *et al.* (2007) similarly reported two groups of barriers; individual barriers, such as confusion, scepticism, lack of trust in information, and societal barriers such as costly facilities for adopting new behaviours.

Kennedy *et al.* (2009) questioned whether the gap between attitudes and behaviour was due to people's expressed environmental values. They found that beliefs were not a constraint, but that practical and societal pressures were. They reported that a number of their respondents were unaware of facilities in their communities and recommended improved advertising and marketing to remedy this. They particularly concluded that information campaigns to reduce perceptions about ESBs being time-consuming or expensive would encourage participation. The Lorenzoni *et al.* (2007) review also recommended that sustained communication was still required in order for people to gain knowledge of climate change and its implications as a means of encouragement to direct energies into appropriate activities.

It is argued then that while it is acknowledged and expected that there will be a gap found in the study reported in this thesis between attitudes and behaviours, this does not invalidate seeking to understand the role that information *does* play in encouraging take-up of ESBs.

1.3.1.3 Alternative community focus and social marketing techniques

(Problem 7, Table 1.2)

Community-based social marketing (CBSM) states that conventional campaigns using media are better at creating awareness than changing behaviour (McKenzie-Mohr, 2000)

and advocates a more personal approach with someone from within the community being able to provide personalised rather than just printed advice. The study in this thesis will examine this hypothesis by examining a range of activities from media coverage to more personal types of interaction.

1.4 Thesis aims, objectives and structure

This chapter has set out the importance of investigating the effectiveness of behaviour change communication by detailing its use as a key policy tool and potentially large expenditure item for the UK as a means of encouraging sustainable consumption in order to mitigate the effects of climate change. How this should be achieved has been shown to be a contested issue with debate as to the best approach.

Criticisms of the ability of communication campaigns to address issues of rational choice or the value action gap do expose their limitations. However, as discussed above, the focus here is to explain the impacts that campaigns *do* have, and investigate some of the other specific criticisms listed above.

The principle of these was identified as Problem 1 in Table 1.2 and provides the focus for the aim of this thesis:

- *To contribute empirical evidence as to whether bottom-up methods do offer a better way to change environmental behaviour than top-down approaches.*

Chapter Two explores in detail what is meant by 'bottom-up' and 'top-down' communication approaches, and why and in what circumstances one is seen as superior to the other. It has the following objective:

1. *To draw on two fields of literature – communication and participation – to identify the characteristics of bottom-up and top-down communication.*

Chapter Three investigates what kind of social science research might be appropriate to analyse different types of community-level communication activities. It begins by discussing the nature of evaluation and its use in applied settings, and then focuses on how evaluations have been approached in the two fields of research introduced in Chapter Two. The purpose is to identify the problems with comparative evaluations in assessing the merits of real world events, with all of the potential confounding problems this might create.

Using interviews and participant observation, Chapter Four takes forward the characteristics of top-down and bottom-up communication as identified in Chapter Two with the following objective:

2. *To identify the characteristics of top-down and bottom-up engagement from a series of case studies and provide a comparative evaluation of the two approaches.*

Chapter Five identifies the theory appropriate to both assess the effectiveness of the different communication activities and explore the underlying processes that might explain how, and whether, communication activities prompt changed attitudes and/or behaviours. The Elaboration Likelihood Model (Petty & Cacioppo, 1986a; Petty & Cacioppo, 1986b) is used to assess the nature of the information and how it is processed, alongside the Theory of Planned Behaviour (Ajzen, 1991, 2005) to assess its impact on the individual. Both theories are reviewed for their function and for how they have performed in previous studies with the intention of identifying and using previously successful measures in the research project reported here. The chapter also sets out the research design for the major quantitative phase of this research, which is to track the effects of the selected communication activities. The chapter reports the hypotheses to be tested, the piloting of the research and how data were screened and prepared for statistical analysis. The statistical analysis methods chosen are also explained.

Chapter Six presents and discusses the results of statistical analysis into whether there are identifiable differences in effects of top-down compared with bottom-up communication. It also reflects on the extent to which the objectives of the research have been met. In summary, Chapters Five and Six pursue the final objective of the research:

3. *To generate a theory based evaluative framework about the effectiveness of communication activities for policymakers, practitioners and the social science community. Particular focus will be on development of a clear and replicable methodology for comparing different communication activities.*

Chapter Seven details what findings policymakers and communication professionals might take forward to inform future communication-based work in the field of behaviour change targeted at ESBs. It also reflects on the value of the findings to the research field and suggests further directions for research. An overview of the thesis structure is presented in Figure 1.1.

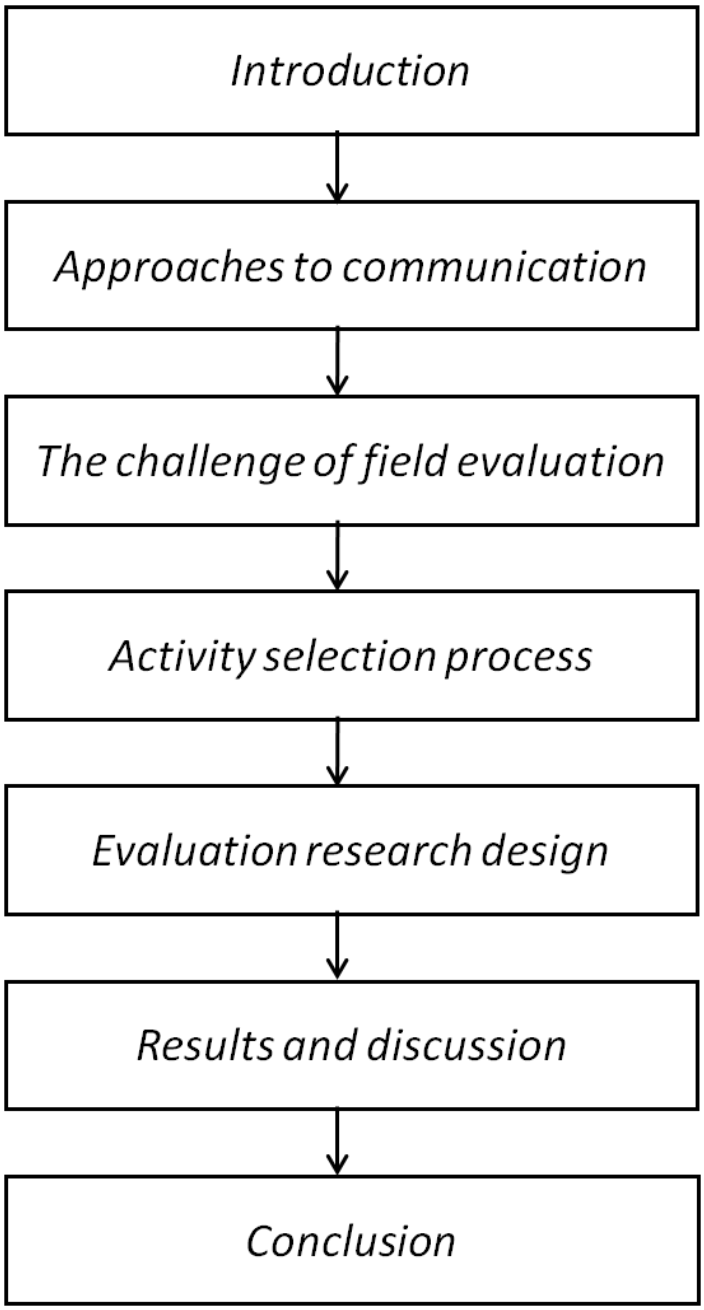

Figure 1.1. Thesis structure

1.4.1 Epistemological approach of this thesis

Kollmus and Agyeman (2002, p. 239) argue that "the question of what shapes pro-environmental behavior[5] is such a complex one that it cannot be visualized through one single framework or diagram." To investigate such complexity in a single study would be in conflict with scientific practice which seeks parsimony, or simplicity (Burnham & Anderson, 2002). When testing a theory for the purpose of judging whether it might generalise to other situations, simpler is generally viewed as offering more general accuracy. Parsimonious theories are more likely to have high explanatory power, in that they can be stated succinctly but explain a great deal (Shoemaker, Tankard, & Lasorsa, 2004). Azjen and Fishbein (1980, p. 150) agree that to try to capture complexity by incorporating "every known social psychological construct and process" in order to fully explain behaviour is likely to create more confusion than understanding.

The study as outlined in this chapter follows this social psychology tradition in omitting factors or barriers to behaviour change, including many identified by studies into the value action gap (discussed above). Rather, it has been designed in an attempt to focus on the variables likely to have the highest explanatory power in the context of the communication activities which are its focus. Cook and Groom (2004) argue that it is much more likely that a social psychology-orientated study would attempt to look at the effects of a specified set of variables on a given outcome than to examine theories that try to explore all of them. As they put it, social psychology studies examine whether X affects Y, rather than discuss all the causes of Y. As such, social psychology belongs to a philosophical tradition which is empiricist (or positivist) in that knowledge is derived from facts that we can experience (Chalmers, 1999). Such studies feature scientific instruments such as survey questionnaires and hypothesis testing. Meaningful knowledge is that which can be verified by the use of such tools (Williams, 2006).

This study also adopts a "modified empiricist" (Williams, 2006) or "post-positivist" approach (Robson, 2002), which acknowledges two potential flaws in the positivist position as identified by the philosopher Karl Popper (1959). This involves accepting that while findings can be found to confirm a theory, they cannot prove it. For instance it is not possible to prove that a variable not yet accounted for may eventually be found to account for the difference between X and Y. It also accepts that *facts* are as experienced, and

[5] Original spelling.

different people bring different levels and types of experience and put different interpretations on a given set of *facts*. In acknowledging these flaws the research project reported here is undertaken on the premise that moral good is served when researchers strive to keep their work independent of personal feelings (Stufflebeam & Shinkfield, 2007). This involves working to control bias, prejudice and conflicts of interest, seeking to supply the best answers and reporting findings honestly.

The main body of the project described in this thesis is characterised by containing hypotheses, quantifiable measures of variables and inferences deduced from findings. Alternatives include interpretive studies which involve understanding how practices and meanings form by studying the language and norms of people (Orlikowski & Baroudi, 1991) and focussing on how people make sense of their world (e.g. Dervin, 1992). Another alternative is critical research, which recognises that reality, although created by people, is constrained by social, cultural and political domination. Much critical research accepts that rather than dealing in *truths* the task of research is to discover underlying issues behind what are *accepted* as truths (Weaver, Motion, & Roper, 2006). An example of critical research which might explore a similar theme to the research project of this thesis would be to investigate the observation by Kennedy *et al.* (2009), that behaviour change communication campaigns might have the effect of distracting the public from attending to potentially bigger and more environmental tasks such as becoming active citizens.

2 Approaches to communication

> *…it is not enough simply to produce yet more messages, based on rational argument and top-down persuasion, aimed at convincing people of the reality of climate change and urging them to act. Instead, we need to work in a more shrewd and contemporary way, using subtle techniques of engagement.* (Ereaut & Segnit, 2006, p. 8)

Chapter One introduced the argument that 'bottom-up' approaches to engaging people work better than 'top-down'. This resulted in the identification of the first key objective for this research, which is to investigate two fields of literature about top-down and bottom-up approaches with a view to identifying the different characteristics of the two engagement types. The purpose is to enable accurate selection of communication activities featuring these characteristics to be selected and an empirical comparison undertaken.

2.1 Current trends in policy and practice

Stakeholder theory argues that *'bottom-up'* approaches, where individuals are actively involved rather than passive, are preferable to those which are *'top-down'* or authority-led (Filmer-Wilson & Anderson, 2005; Owens & Driffill, 2008) because they will be more likely to achieve their objectives. However, Blewitt (2005, p. 174) argues that current practices in government in the UK are still shaped by the "managerialist governmentality" which has dominated public life since the late 1980s, with rigid processes such as pre-specified outcomes favoured over learning from practice, reflecting and sharing. The advocacy for alternative bottom-up approaches has been particularly insistent in the UK over the issue of climate change communication (Anable *et al.*, 2006). The absence of this approach is cited as the reason why greater numbers of people are not reducing polluting behaviours (Barr, 2003; Ereaut & Segnit, 2006). This thinking is echoed by Anable *et al.* (2006, p. 2) who agree that people need to be engaged about climate change "using deliberative methodologies to deviate from traditional 'top-down' methods of information provision". It is acknowledged by Watson and Noble (2005, p. 3) that the "one-way informational concept of public relations as the practice of persuasive publicity continued as the dominant mode throughout the 20th century".

In contrast, growing disillusionment is now reported among environmental managers who have failed to see enhancements that bottom-up approaches promise (Reed, 2008). Also, the supposition of greater effectiveness exists alongside a "dearth" of evidence from comparative evaluations (Blackstock, Kelly, & Horsey, 2007, p. 728). It is a common

complaint that there is very little evidence of comparative studies of participative methods or of studies which evaluated participative alongside non-participative methods (Carr & Halvorsen, 2001; Halvorsen, 2001; Reed, 2008; Rowe & Frewer, 2000). A review in the UK in 2003 failed to identify a single empirical study which rigorously compared the use of different approaches (e.g. top-down vs. bottom-up) or which compared different types of bottom-up deliberative methods (Abelson *et al.*, 2003). While studies of participation since 2003 have developed researchers' understanding of the effectiveness of various engagement processes (e.g. Abelson *et al.*, 2007; Lucumí *et al.*, 2006), the gap in comparative studies remains.

2.1.1 Top-down

Top-down is described as an "expert-led" model in which government imparts information and makes clear the type of behaviour it expects from the public (Collins *et al.*, 2003, p. 11). Top-down communication is associated with "intervention" from authority as opposed to being "spontaneous" community action (Downing, 2007, p. 30). Such communication assumes there is a deficit in public knowledge and understanding which can be "filled" by experts. (Burgess, Harrison, & Filius, 1998, p. 1446). Among key campaigns criticized as examples of top-down initiatives failing to deliver behaviour change in the UK have been the Energy Saving Trust's *Save your 20%* campaign in 2005-06 for "instructing" and "cajoling" its targets (Ereaut & Segnit, 2006, p. 26). Defra's *Are You Doing Your Bit* (AYDYB) campaign of 1998-2000 was also criticised. Owen (2000, p. 1142) questioned whether there was a better demonstration "of the flaws in the information deficit model than the persistent refusal of the public to have their allegedly irrational conceptions of risk 'corrected' by providing them with more information". The high profile advertising-led campaigning of AYDYB was also criticised for only delivering "small changes in consumer attitudes or behaviour" (House of Commons Environmental Audit Committee, 2003, p. 33). The failure of AYDYB was compared to the achievements of smaller scale community projects (Ginn, 2004; Hobson, 2003; Kollmuss & Agyeman, 2002; Owen, 2000). However, Darnton (2004) acknowledges that while AYDYB was frequently criticized for its inability to change behaviour, the targets set within Defra had been for *awareness* raising, and targets within this remit were achieved. It can be concluded that many of the critics of AYDYB based their observations not on empirical research of the campaign itself, but rather were criticizing its failure to change *attitudes* with the huge budget at its disposal, even though changing attitudes was not the intent of the campaign. This general assumption about campaigns, based not on detailed analysis of a specific communication campaign but

rather on two facts which seem to be related is not uncommon. The conclusion that information campaigns have had little or no impact on individual behaviour is also made by Lorenzoni *et al.* (2007) on the *a priori* evidence that despite their existence UK energy demand is still rising.

2.1.2 Bottom-up

By comparison bottom-up communication appears less defined. It is characterised by being "linked to locally or regionally relevant issues, and where it can come through trusted and recognized channels" (Elliot Morley, M.P., in Hounsham, 2006, p. 45). This theme is echoed by Barr, Gilg and Ford (2003, p. 36) who argue that "a personal, practical and trusted approach" would be more likely to be effective. Bottom-up initiatives are described as a "more decentralised system of information delivery and public engagement" using "deliberative methodologies" (Anable *et al.*, 2006, p. 164). This "more deliberative form of communication" (Owen, 2000, p. 4) is further described by Burgess *et al.* (1998, p. 1447) who call for "more inclusionary forms of dialogue between lay publics and elites" using "new forms of communicative practice" aimed at consensus building and mediation in order to transform the "paternalism" of traditional forms into "inclusionary argumentation".

2.2 Underlying philosophy of communication approaches

The argument was introduced earlier in this chapter that a bottom-up approach might be more appropriate for a modern society (Ereaut & Segnit, 2006). Adapting to changed audience expectations has been described as altering the philosophical foundation of campaigning, "…giving greater emphasis to audiences' social and cultural contexts, by replacing experts' goals with audience-derived goals, and by using audience networks as ways to generate, frame and share messages" (Rice & Atkin, 2002, p. 430-1). Abelson *et al.* (2003, p. 239) argue that the health service in the UK[6] is now grappling with the attempt to create an atmosphere where communicative action can take place, and that this is in recognition of the fact that society has changed and "methods used in the past are no longer appropriate for … a more educated, sophisticated and less deferential public". Communicative action is one of two communicating types described by the philosopher Jurgen Habermas; a key characteristic is that participants are primarily focused on reaching

[6] Nisbet and Gick (2008) argue that the parallels between health and environmental behaviours are such that lessons learned by those trying to change health behaviour are also likely to apply to those seeking to change environmental behaviour.

understanding rather than on "calculations of success" (Habermas & McCarthy, 1984, p. 286). The other communication type is strategic action, which refers to situations where "actors are not so much interested in mutual understanding as in achieving the individual goals they bring to the situation" (Bohman & Rehg, 2007). Habermas' theories are not about measuring behaviour empirically, but about explaining the structures required for reaching understanding, (Habermas & McCarthy, 1984p. 286) and as such have relevance in identifying the concepts, structures and stances that differentiate between top-down/bottom-up communication. It will be seen that Habermas' theories are drawn on by researchers in both the communication and the participation literatures.

2.3 Communication models

Rice and Atkin (2002) identify two communication models which explore the activity by philosophical approaches; Grunig's symmetrical and asymmetrical communication and Dervin's formulation of sense-making. It is argued that both capture the concept of top-down and bottom-up and in doing so add to this study's ability to define and select appropriate communication activities to compare.

2.3.1 Symmetrical and asymmetrical models of communication

Excellence theory, a general theory of communications management (Grunig & Grunig, 2008), evolved to focus on two types of philosophical approaches to communicating: symmetrical and asymmetrical (Grunig, 1992, 2001; Grunig & Grunig, 1989; Grunig, Grunig, & Dozier, 2006). Initially based on systems theory (Grunig & Hunt, 1984), it was thought an organisation's communications output and approach would follow from the type of organisation on whose behalf it was practiced. An asymmetrical approach is described as a "method of scientific persuasion" and is used "to identify messages most likely to produce the support of publics without having to change the behaviour of the organisation" (Grunig & Grunig, 1989, p. 31). The symmetrical mode sees negotiation and bargaining to bring about "symbiotic changes in the ideas, attitudes and behaviors of both the organisation and its publics" (ibid). Symmetrical communication is also described as taking place through dialogue, negotiation, listening, and conflict management rather than through persuasion, manipulation, and the giving of orders (Kim, 2005).

It has been theorised that the choice of asymmetric or symmetric communication can be dictated by the nature of the organisation, and that organisations with liberal and external values would choose symmetrical communication (Grunig & Grunig, 1998). Other

attributes of an organisation employing symmetrical communication are holism, interdependence, innovation, conflict resolution and communication as a path to understanding (Grunig and White, cited in Huang, 2004, p.335). Symmetrical communication is described as normative, in that it describes the model of communication method that should be applied because it has been found to be the most ethical and the most effective (Grunig & Grunig, 1992). In practicing symmetrical communication, organizations are clearly delineating the difference between a persuasive marketing function and communication that has the dialogue function as described by Habermas (Ehling, White, & Grunig, 1992, p.388), where the use of public relations techniques creates a "special kind of communication system, one that is designed jointly by the parties of an actual or potential conflict situation" (ibid). Asymmetrical communication on the other hand, is described as "generally top-down… typical in mechanical type organizations with authoritarian cultures" (Kim, 2005, p. 204). Asymmetrical-inclined organisations see "communication as a tool with which to change the cognitions, attitudes, or behaviors of another person, organization or system" (Huang, 2004, p. 335).

2.3.1.1 Critics of symmetrical and asymmetrical models of communication

The notion that symmetrical communication alone represents the gold standard of communication has been challenged, especially when it has been found that most organisations appeared to practice a range of communication styles (Murphy, 1991).

Following a fifteen year research project into symmetrical and asymmetrical communication a revised 'Excellence Theory' acknowledged that organizations incorporate features of both models to reflect the fact that while "…the concept of symmetry directly implies a balance of the organisation's and the public's interests…total accommodation of the public's interests would be as asymmetrical as unbridled advocacy of the organisation's interests" (Grunig, 2001, p. 15). Murphy (1991) argues that her revised model sees symmetrical and asymmetrical communication not as two completely different entities, but as the two end points along a continuum. She argues that most organised communication situations are located somewhere along the continuum and the position on that continuum will be dependent on the power held in each situation.

Critical scholars have highlighted that supposedly symmetrical communication operates asymmetrically because one party usually has more power and sets the agenda about what to talk about and to whom (L'Etang, 2006). Indeed it is this lack of recognition of the power difference between parties that prevents it from being an otherwise "obvious parallel" of

Habermas's communicative action (Leitch & Neilson, 2001, p. 132). Whereas Habermas was concerned with equal debate, Leitch and Neilson argue that true equality of discussion cannot take place between a powerful organization and its less powerful publics and for this reason, true symmetrical communication is rarely found in organizations practicing professional communication because such organisations rarely perceive advantage in making compromises with less powerful publics. These criticisms seem to suggest that a choice of communication approach is defined by more than the nature of the organization. Relative power has subsequently been identified as one of several external factors to predicting what kind of communication approach is adopted, along with others including perceived level of threat, industry environment, political environment, and the relationship record between the two parties (Shin, Cameron, & Cropp, 2006). Seven internal factors were identified in the same analysis: organizational development, culture, relative independence of communication team, linkages of communication team to top management, personal characteristics and capabilities of communicators.

2.3.2 Sense-making

Sense-making is the second communication model named by Rice and Atkin (2002) as assessing communication by its underlying philosophical approach. Sense-making stems from the reflection that top-down persuasion is insufficient to prompt behaviour change. According to Dervin and Frenette (2001, p. 70),

> *There is widespread agreement that most communication campaigns directed at bettering audiences have either failed or have met only modest objectives, at extraordinarily high cost and with requisite high redundancy in message transmission. This negative analysis... applies to the traditional one-way public communication campaign assumed to infuse audiences with the will to change because of sheer transmission of 'expert' information.*

Sense-making identifies four broad approaches to communication which operate at points along a continuum. The first is characterised by one-way transmission of expert information alongside other elements likely to improve audience efficacy, such as instructions on how to use the information. The second is still based on the top-down campaign but can be adapted from community to community, or culture to culture, according to different group and community experiences and understandings. In the third model, status is given to non-expert views, even when they differ to expert views, and a fourth model allows the truth claims of experts to be examined for how social issues like class, politics and economics are implicated in their formation.

Sense-making is also described as both a theory and a dependent methodology. Its tightly defined methodology requires a specific type of explorative qualitative interview where subjects are required to recall events in some detail (Dervin, 1992).

Sense-making involves an interpretive approach not adopted by the study reported in this thesis. As such, sense-making is only explored as far as it assists in defining concepts of top-down and bottom-up.

2.3.3 Communication summary

This review has identified characteristics of top-down and bottom-up communication approaches. The selection of approach has also been identified as being associated with the relative power of the parties involved in communication, the perceived level of threat and political environment. These characteristics and factors will be used to help identify the top-down and bottom-up approaches that are to be compared in this thesis.

2.4 Participation

Communication research is not the only field of inquiry to be interested in engaging the public through inclusion, deliberation and participation. The importance of participation and the human response to climate change were first linked by the World Commission on Environment and Development (WCED, 1987) This was followed by the Aarhus Convention[7] in 1998, to which the UK was a signatory and which committed participating governments to guarantee the rights of access to information and public participation in environmental decision-making (Dalal-Clayton & Bass, 2002; Petts & Leach, 2000). Participation is often defined by how it differs from simple dissemination of information. An Organisation for Economic Co-operation and Development report (OECD, 2001, p. 16) describes active participation as "an advanced two-way relation between government and citizens based on the principle of partnership" and gives examples as working groups, laymen's panels and dialogue processes.

Participation is defined as a process where individuals, groups and organisations take an active role in making decisions that affect them (Reed, 2008). Participation involves a range of measures designed to consult, involve and inform the public so that those affected by a decision have an input into it (Rowe & Frewer, 2000). Bracht and Tsouros (1990, p. 201)

[7] The United Nations Economic Commission for Europe's Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (the Aarhus Convention) was agreed at Aarhus in Denmark in 1998.

describe participation as a “bottom-up” approach and say it operates under a number of different terms: participation; involvement; partnership; and collaboration, depending on the circumstances. They argue that participation is about community ownership, where communities shape their own directions and emerge with skills and resources. Involving participants improves projects because they have the benefit of added local knowledge (Blackstock *et al.*, 2007). Stakeholders often possess local, traditional and context-specific knowledge that increases understanding of the issues. Filmer-Wilson & Anderson (2005, p. 10) argue that such active participation is more likely to lead to programme objectives being achieved, because “programmes are more likely to meet local preferences and needs, use local knowledge and technology, and match local capabilities to sustain the projects".

Echoing the discussion in the communication literature, researchers in the participation field have also recognised that participation approaches fall along a continuum anchored at either end with either maximum or minimum involvement. Reed (2008) specifically likens such approaches to Habermas’ communicative action theory in that some types of participation are designed as delivering a means to an end while others are designed to encourage the democratic rights of people to be involved in decision-making. Bass *et al.* (1995) describe the least participative approach as having participants listening only, and give the example of receiving information from a government public relations campaign. Their typology then has participants both listening and giving information, such as being offered a feedback mechanism to media coverage via a telephone hotline. The typology continues through public consultation, featuring characteristics like issue analysis, to participant consensus and involvement being a feature of decisions.

Oxley Green and Hunton-Clarke (2003) reviewed six participation typologies including what is thought to have been the first, Arnstein’s Ladder (1969), which used rungs to represent differing levels. They concluded that despite many typologies having many levels, there are three key broad types of participation:

- information provision, with possibly very limited and narrow feedback mechanisms;
- consultation, where attitudes and values of participants are sought and may influence an organisation’s plans;
- decisional, where views and knowledge are shared at an early stage and an organisation is flexible in accommodating those views in decisions.

Rowe and Frewer (2005) argue that it is too broad to define participation as any mechanism which involves the public in agenda-setting, decision-making and policy-forming, however passively. They say that this broad range of activity equates to "public engagement" (p. 284) of which there are three key types, similar to those outlined above - public communication, public consultation and public participation. They say these are characterised by the flow of information between participants and organisers of the mechanism. As shown in Table 2.1, the first type involves one-way communication. The second involves communication from the participants only. True participation involves dialogue. They offer a suggested typology to match types of approach to the types of mechanism used, with a view to providing guidance on what mechanism will work best for which approach. In it, use of publicity via newsletters or media equates to public communication, and a self-selecting group of people coming together to discuss an issue (such as in, for instance, a study circle) is defined as a public consultation mechanism.

Table 2.1. Three types of public engagement, adapted from Rowe and Frewer (2005)

Engagement type	**Flow of information**		
Public Communication	sponsor	→	public
Public Consultation	sponsor	←	public
Public Participation	sponsor	←→	public

Abelson *et al.* (2007) agree with typologies which range from those in which the public are treated as "full and equal partners" and communication exercises treating people as recipients of information. However, they emphasise that while such typologies mean that researchers are getting closer to a common set of frameworks, participation remains a complex and value-laden concept with multiple purposes, meanings and levels.

Participation is often defined as referring to engagement in policy decisions, and it will be recalled that in behaviour change communication projects people are being engaged with issues to do with their own behaviour, not deciding on the behaviour others should be asked to adopt. Chess and Purcell (1999) argue that a successful participatory process is not assessed only by whether it produces better policy decisions, but by whether it achieves acceptance of such decisions, consensus and educates participants. It is argued here that by taking action as a result of attending to communication, participants targeted for the communication activities of the type investigated in this thesis are engaging in a participatory process. By changing behaviour they are showing evidence of education and

of reaching consensus with the communicator. It is also argued that with communication approaches at the higher end of the participation continuum, or exhibiting strong bottom-up characteristics, the participants are choosing to get involved and are making decisions, about their own behaviour if not that of others.

2.4.1 Deliberation

Deliberation, a term often used interchangeably when participation is discussed, refers to a particular type of participation in which discussion is a key feature, such as when "citizens consider relevant facts from multiple points of view, converse with one another to think critically about options before them and enlarge their perspectives, opinions, and understandings" (Torres, 2006). A key criteria of deliberation is collective problem solving and discussion between individuals of different backgrounds to "listen, understand, potentially persuade and ultimately come to more reasoned, informed and public spirited decisions" (Abelson *et al.*, 2003, p. 241). Use of deliberative processes is more likely to signal a view of participants as engaged citizens rather than passive recipients of information.

2.4.2 Participation summary

As with the communication literature, participation is found to operate on a continuum of types. Again following a similar theme, communication flow is one-way with the least participative type, and can be motivated by the pragmatic requirement to get a good, or correct, decision. More participative methods are signalled by dialogue, involvement and a two-way flow of information and views.

2.5 Summary of communication and participation literature

It is argued here that despite coming from two differing fields of interest, the participative and communication literatures are addressing the same philosophical approach, indeed both are referred to as being consistent with Habermas' ideas about the structures which underpin communicative action. They are therefore equally useful in identifying characteristics of top-down and bottom-up communication modes.

The characteristics of top-down as identified in this chapter suggest a communication type which is:

- expert-led, paternalistic, authoritarian
- asymmetrical or even one-way

- features scientific persuasion, instructional, transmission of information.

The characteristics of bottom-up as identified suggest a communication type which involves:

- dialogue, negotiation and deliberation
- participation, collaboration, partnership
- involvement in decision-making.

2.6 Chapter summary

The purpose of this chapter has been to review in detail the literature and guidance surrounding the use of bottom-up and top-down communication approaches. This identified an evidence gap in being able to support this advice, justifying the aim of this thesis, which is to contribute empirical evidence as to whether bottom-up methods offer a better way to change environmental behaviour than top-down approaches. It also delivered the first objective of this thesis, which was:

> *To draw on two fields of literature – communication and participation – to identify the characteristics of bottom-up and top-down communication.*

These two fields of literature offer very similar typologies and descriptions of these two approaches that can be used to identify characteristics useful to categorise communication activities. The literature reviews of the two fields have also identified variables which may predict what type of communication approach is being practiced, such as communicating organisation. Grunig and Grunig (1992) argue that assessments of which communicating type is operating can be made through qualitative examination of artefacts, interviews with practitioners or observation of activities, and this is taken forward in Chapter Four. The next chapter will examine how such activities might be evaluated with a view to comparing approaches.

3 The challenge of field evaluation

> *Despite a long history of experimentation, we still know very little about what does and does not work when it comes to designing public involvement processes.* (Abelson *et al.*, 2007, p. 2116)

Chapter Two identified that there are different approaches to communication and that these have been explored by more than one field of inquiry. It also identified that one type of approach is seen as being more effective, though the evidence to support this is lacking. This chapter begins by discussing the nature of evaluation and its use mostly in the field or 'real world' settings, as a means of defining its use in this thesis. It then focuses on communication and participation activities in particular in order to address how these are evaluated, especially when trying to compare different approaches.

3.1 Evaluation defined

Evaluation serves a range of purposes and can take place before, during and after a project (Trochim, 2002). It is a developing discipline encompassing a range of approaches and activities, which makes the creation of a simple and agreed definition difficult (Stufflebeam & Shinkfield, 2007). It is described as transdisciplinary, in that it has been required to draw from a number of academic and other disciplines and involves the use of many different tools (Yarbrough, Shulha, & Caruthers, 2004). There is no agreed definition, but Patton's (2008) requirements that it involve systematic collection of information with the purpose of providing feedback to improve programme effectiveness and provides information about what programmes are working and why, are regularly drawn on as a guiding principle (e.g. Newburn, 2001; Robson, 2002; Stufflebeam & Shinkfield, 2007). It has also been described as "the process of systematically aggregating and synthesising various types and forms of data for the purpose of showing the value of a particular program" (Wilde & Sockey, 1995, p. 3).

3.2 Historical evaluation and social science research tensions

Evaluation has its origins in the social sciences (Trochim, 2002; Yarbrough *et al.*, 2004), particularly those fields which make use of experimental and quasi-experimental approaches. But, as the practice of evaluation has grown into many different sectors, its methods have expanded (Maruyama, 2004). Newburn (2001) reviews the differences that have emerged between evaluation and the traditional social research background it originated from, arguing that evaluation's origins is in addressing practical problems

whereas research has addressed theoretical ones. Evaluation has been associated with judgements of value whereas social science research has described what has been found. Evaluation focussed on short-term goals, with research more interested in the longer term. Evaluation could be conducted by people involved in the programme being evaluated, whereas research was more often conducted by those outside. Scriven (in Coffman, 2004) acknowledges that these conventions are blurring but says they are useful to illustrate the areas of difference to negotiate when planning evaluation research.

There are two issues of interest or contention over whether an evaluation would meet criteria to assess the positivist research objectives of this thesis. The first concerns the testing of theory. Some evaluators argue that evaluation should be focused on what works in local settings. Maruyama (2004, p. 430) reviews this argument and says that for these people "testing theories and searching for generalisable principles is an unnecessary distraction that takes away from the primary goal, that of finding out what works". He contrasts this with the focus of social psychological research, which sees theory as providing the vital function of isolating the complexities of real life situations, a necessary requirement before campaigns can be evaluated well. He also argues that campaign evaluation research can be used to extend and improve theory about media effects and social change (see also Salovey & Steward, 2004).

Along with the role of theory, the other issue of concern to traditional or positivist social psychological research is the potential for methodological requirements to be compromised by the real time and setting of much evaluation. Cook and Groom (2004) describe the "overwhelming" majority of social psychology studies as conducted using experimental conditions and undergraduates as participants. Such studies are designed to evaluate effects under optimum conditions (Evans *et al.*, 2009). By contrast, evaluation is field-based, occurring in real world settings. It usually involves collaboration with practitioners and to work in their environments, not laboratories (Maruyama, 2004). Evans (2008, p. 188) agrees that much communication research, "... especially mass media campaigns, are effectiveness studies conducted in real time, in the media markets or communities in which messages are delivered". Funds may be too limited for campaigns to reach a wide enough audience to detect campaign effects. Snyder (2007) points out that, due to funding and other limitations, health communication campaigns in the United States for instance only reach an average of 40% of the population. Evans and Snyder both report that effect sizes in evaluation research can be small, at less than ten percent. This can be because the rigour or "gold standard" (Evans, 2008, p. 189) of a randomised experimental design is not always

possible. Control groups allow the effects of a programme to be compared against a group of people excluded from the campaign (Snyder, 2001). This optimizes the chances of achieving maximum effects sizes, but programme organizers are often reluctant or find it unethical to exclude some of a target group for the purposes of evaluation. Evans reviewed 33 studies of social marketing campaigns in which only three had a randomized experimental design, five reported findings from quasi-experimental designs, and 25 were based on observational designs. A systematic review of HIV/AIDS mass communication studies between 1998 and 2007 studied 34 campaigns and found that 24 had used single group pre- post-test or single group post-test only designs (Noar, 2009).

It should also be acknowledged that while experimental conditions of the type described are seen as optimum, they are flawed when it comes to giving feedback about real world effects; Evans *et al.* (2009) point out that experiments, by lacking real world conditions, do not allow researchers to make conclusions about achieving similar effects when such conditions are present.

This section has demonstrated some of the challenges that a social science researcher interested in field-based evaluation must confront, and also some of the choices to be made in selecting research designs. Experimental research offers maximum effects and generalizability; field work can give feedback about real effects in real situations. The concerns of academics and professional evaluators can be reconciled as evidenced by the fact that all of the works discussed in this section are reviewing examples of evaluations conducted within the social science discipline. Further justification of evaluation as an appropriate endeavour for this thesis is discussed in the summary at the end of this chapter.

3.3 Functions and types of evaluation

The various types of evaluation that can be undertaken will be briefly reviewed here as a means of isolating and clarifying the type to be conducted in this thesis. This chapter earlier defined evaluation as being associated with assessing value and a key valuation is of effectiveness. Stufflebeam and Shinkfield (2007) raise the question of how effectiveness should be assessed and reject an early and still prominent notion that evaluators should deem a project successful if it meets its objectives. They argue that these may have been ill-conceived, reflective of the needs of those in charge rather than the intended beneficiaries and generally leads to too much of an outcome focus. They argue that to concentrate on outcomes is to ignore the potential for uncovering side effects which could be at least as

important as whether objectives are achieved. They sum up that the fundamental purpose of evaluation is not to prove but to improve.

Newburn (2001) reviews other purposes of evaluation, such as for accountability; development, such as to improve the programme; or knowledge, such as to provide deeper understanding of a programme. He argues evaluations deliver different uses depending on when they are conducted. Evaluations before the start of a programme can judge feasibility. As a programme progresses, formative evaluation and programme monitoring can provide information to improve it. Summative or impact evaluation focuses on outcomes and effectiveness. Evaluation can also be of the process, such as whether it is considered fair and trustworthy. Others (e.g. Timotijevic & Raats, 2007) have examined less direct outcomes such as whether levels of empowerment have increased, social or cognitive learning achieved or whether stakeholders were satisfied.

Evaluation also has to cater for the different values which could be sought. In a culture concerned more with competition rather than with inclusiveness and shared prosperity (World Bank, 2002), and where assessment of nation well-being is done on monetary terms (Hardi & Zdan, 1997) there will be temptation by sponsors to produce evaluations which are politically desirable. Wilde and Sockey (1995) call this an administrative evaluation – where the work is done for public relations purposes. This is acknowledged in recent guidance from a European Union-funded investigation into energy change projects:

> *Unfortunately, political pressures often lead to the need for taking quick, visible actions. This may translate into programmes which create attention, but which in reality result in little by way of changed behaviour. Of course raising awareness is desirable, but it may not in itself achieve much by way of reduced consumption.* (Dahlbom *et al.*, 2009, p. 12)

The evaluation research proposed in this thesis will take the form of what Lamie and Ball (2010, p. 113) describe as the "black box approach" where effects are inferred from the relationship between participant evaluations assessed at the time of the activity and self-reported behaviour change as a result of the activity. The limitations of this narrow outcome focus are acknowledged, and the research in this thesis is therefore not able to comment on other potentially desirable outcomes such as enhanced capacity or social learning among participants. However, this tight parsimonious focus is in keeping with the epistemological approach set out in Chapter One and is appropriate to examine the objectives which were set out at that point. It will not, as other evaluation approaches might, examine the programme holistically, examining both inputs and outputs. While primarily concerned with the outcome of behaviour change, the research in this thesis does, by assessing participant

reactions to the activity as well as behavioural outcomes, have a formative evaluation element, although again it is acknowledged that due to timescales the value of this may be limited to future programmes other than those observed. The independence of the evaluation from the activities' sponsors defends it from an accusation of being an administrative evaluation.

3.3.1 Communication evaluation

The purpose of communication campaigns was set out in Chapter One and Devine and Hirt's definition (1989) is adopted here as an accurate description of the activities to be evaluated in this research. They argue that a communication campaign is an organised attempt to influence the beliefs and attitudes of others on a particular subject through the use of mass media or other communication channels. Chapter One also set out how use of communication can be a policy alternative to engineering or enforcement solutions. Whereas these alternatives may prove straightforward to evaluate, the value of communication solutions is more difficult to prove.

Laborde and Pompper (2006) note communication industry issues over consensus about tools and the cost of evaluation. They also record that many people working in the industry, especially in the not-for-profit sector, feel that the results and benefits of effective communication are too abstract and idiosyncratic to be measured. Valente (2001, p. 105) argues that rigorous communication research can improve programmes and that their worth should not be measured by "whether implementers 'feel' a campaign has succeeded but, rather, in the program's influence on the communities and stakeholders it is created to benefit". Recent developments in establishing communications evaluation principles continue to urge communicators away from measuring *outputs* like levels of media coverage and towards the *outcomes* of such coverage (Grupp, 2010).

3.3.1.1 What is evaluated?

The study of communication via media such as radio, press, film, and other channels originally focussed on its impact on the key variables of "who says what in what channel to whom with what effect" (Lasswell, 1948, p. 216). This classic statement has resonances which continue to be influential. Communication scholars continue to focus on source, message, recipient and context variables (Petty & Wegener, 1998) to which McGuire (2001) also adds channel, the medium used to deliver the communication. Following work tightly associated with the communication itself came combinatorial models, including the

Theory of Planned Behaviour, which focus on the cognitive processes on which communication must impact (Johnson, Maio, & Smith-McLallen, 2005).

As with evaluation generally, Salmon and Murray-Johnson (2001) point to communication evaluation sometimes being focussed on a campaign's political value. Media campaigns in particular can provide a visible and public image for a politician, and could be valued more for political than programme effectiveness. Programme effectiveness might be judged by estimating its cost-effectiveness, for instance by measuring the number of people stopped from smoking against the cost to society of getting smoking-related diseases (Salmon & Murray-Johnson, 2001). Rice and Atkin (2002) concur with cost effectiveness as one measure of the success of a campaign and list more:

- audience - how many and with what characteristics were reached;
- implementation - how many people were exposed to the message or service;
- effectiveness - influence on attitudes/behaviours;
- impacts or effects beyond those exposed, e.g. families; and
- causal processes - reasons why effects occurred, or not.

This suggests that the impact of the communication, or summative assessment, is the dominant form of evaluating communication. Indeed Balch and Sutton (1997) argue that the emphasis on formalised summative research is at the expense of other valuable evaluation during the campaign which might improve the programme. It is argued here that all evaluation is, finally, about improving and refining the campaign and its outcomes. Coffman (2002), for instance, describes the use of formative evaluation as a means of collecting and assessing information to help shape or improve a campaign.

3.3.2 Participation evaluation

It has already been documented that the terms 'participation' (defined in Chapter Two) and 'evaluation' (earlier in this chapter) encompass many types of activity. Chapter Two also reflected on the small amount of empirical research into different forms of public participation. Abelson *et al.* (2007) argue that while getting closer to a common set of frameworks for conducting participation, evaluation of participation still fails to provide decision makers with the research evidence they need to inform subsequent future involvement processes.

Stirling (2006) argues that the purpose of the evaluation can affect its focus. The evaluation could be driven by wanting to discover whether all constituencies have been engaged in dialogue as an end in itself. It could be to ensure that the dialogue has proven a means to making better decisions, or it could be driven by process considerations, such as that an exercise conducted well, may enhance public trust and credibility. Webler (1995) puts forward fairness and competence as two over-arching criteria for evaluating participation. Abelson *et al.* (2003) say fairness equates to equality of opportunity to take part in the process, and competence relates to ensuring appropriate knowledge and understanding of an issue is gained. They add two further criteria: how information is selected and presented, and outcomes. Outcomes could include whether better decisions are taken and whether all parties are satisfied with the decisions. Rowe and Frewer (2005) agree that a key problem with evaluation of participation methods is that effectiveness is not well-defined. Their typology of participation methods was discussed in the previous chapter and set out three broad categories: communication, with one-way information flow to public; consultation, with one-way flow to the organisation; and participation, with two-way flow of communication. They suggest that measurement of communication should be the extent to which knowledge has been gained and processed by the relevant population. Measurement of participation should be by assessment of the same variables but in two directions – from participant to organiser and vice versa. In assessing which mechanisms deliver the most effective participation they set criteria such as whether it reaches the maximum (preferably all) members of the relevant population and whether the medium for message delivery allows recipients to fully understand the information.

Chess and Purcell (1999) reviewed research of participatory events on environmental issues and found that they tended to be assessed under two categories, those that assessed outcomes and those that assessed the process. As a result of their review they recommended that one way to achieve maximum participation is to offer various types of participative methods to involve the largest number of people. Reed (2008), reviewing the current state of participation in the environment field, argued that while there is evidence emerging that participation does improve the quality of the outcome, it is also clear that quality of the outcome is related to the quality of the process; in other words how well the participation event is perceived is a factor in the quality of the outcome. Blackstock *et al.* (2007) argue that evaluation itself should be participatory, and conducted by those involved in the process. For an overview of this debate see Weaver and Bradley Cousins (2007).

3.4 Problems with comparative evaluations

There are numerous examples of academic studies of what could be called top-down interventions (Ajzen, 2005; Ajzen & Manstead, 2007; Armitage & Conner, 2002; Braverman, 2008; Conner *et al.*, 2007a; Davis *et al.*, 2002) and there are also many examples of community or bottom-up projects being studied (Hargreaves, Nye, & Burgess, 2008; Hobson, 2002, 2003; Howell, 2009; Owen, 2000; Staats, Harland, & Wilke, 2004). However, there is a dearth of studies which aim to examine the proposition that one is likely to be more effective than the other (Blackstock *et al.*, 2007). A review into National Health Service consultation in 2003 revealed the extent of the gap:

> *Our review … has failed to identify a single study in the health sector, or elsewhere, that has rigorously compared the use of different participation methods (e.g., comparison of different deliberative methods or comparison of one deliberative method vs. a non-deliberative method) for the same decision-making process, or assessed the relative costs of these methods against their effectiveness.* (Abelson *et al.*, 2003, p. 248)

The review highlighted the difficulties of such studies, such as effects becoming entangled by the different contexts of, for instance different communities. This is the challenge faced by Burgess *et al.* (1998) who studied communities operating under different political cultures and in two different countries but could not compare the two due to the complexities offered by the different contexts.

In their health sector review, Abelson *et al.* (2003, p. 249) argued that in circumstances where the decision-making process was the same and the context controlled, different approaches may be compared. They argued a strong case for such research given citizen concerns about achieving value for money and decision makers' interests in "low cost high yield" consultations. Timotijevic and Raats (2007) also argue there is a significant gap in the literature of empirical evaluations of different methods of participation, sometimes due to practical problems presented, such as the same method but non-comparable groups, and sometimes due to a lack of access by researchers in being able to gather both pre- and post-participation data from people involved. Their own attempt to contribute to this absence is included in the next section, which reviews the progress that has been made in the comparative evaluation of communication and participation approaches.

3.5 Review of evaluations

To select appropriate methods in order to address or avoid some of the problems just identified, literature was gathered which contained guidance relevant to the research project

discussed in this thesis. In an attempt to locate materials published since the review by Abelson *et al.* (2003), and facilitate a similar review of communication comparisons, two literature searches were undertaken using search terms suggested by keywords provided in literature already reviewed in this chapter (for details see Appendix 1).

3.5.1 Issues and themes identified in review

The review revealed the themes of interest on which to focus, the range of ways of studying comparative evaluations and the challenges to be overcome, offering key lessons for conducting real world comparative evaluations of communicative processes. Such evaluations look at differences in communication channels in terms of whether they have impersonal or interpersonal characteristics (e.g. Pfau, 1990), and whether they offer dialogue face-to-face or as part of a group exchange (e.g. Burgoon *et al.*, 2002; Campbell *et al.*, 2008; Werner, Sansone, & Brown, 2008). They can be evaluated with a range of measures including by looking at outcomes such as attitude, knowledge acquisition and behaviour (e.g. Lucumí *et al.*, 2006; Marcus *et al.*, 2007; Pfau, 1990). They can be undertaken in the field using quasi-experiments (e.g. Campbell *et al.*, 2008; Carr & Halvorsen, 2001; Lucumí *et al.*, 2006; Timotijevic & Raats, 2007) or in laboratory, or experimental, conditions (e.g. Burgoon *et al.*, 2002; Werner *et al.*, 2008), with each method having limitations.

3.5.1.1 Isolating channel differences and identifying key characteristics of channels

Two studies in particular give guidance about studying different channels and more importantly the characteristics of those channels. Pfau (1990) hypothesised the channel or medium used to pass the message may produce different effects, specifically that television (TV) messaging would prove to have more person-like communication effects than print or radio. He randomly assigned university students to one of five different communication modes or to a control group. Each of five groups received messaging designed for its similarity of content via a different medium. TV scored strongly as the medium with the most relational impact, even though another channel used was interpersonal communication. Pfau suggested TV was more like face-to-face communication than any of the other media channels. Reporting surprise at the relatively poor performance of interpersonal communication he reflected that this should have had the characteristics of being “transactional” but instead had taken the form of a “traditional” and “linear” communication with the source dominating the exchange (Pfau, 1990, p. 209). Pfau emphasised that the exploratory nature of the investigation limited statements about

generalisability but advocated further communication mode studies, including investigations in the field.

Schooler *et al.* (1998) studied a health campaign trying to reduce risk of cardiovascular disease and measured TV shows, TV public announcements, newspaper coverage, booklets and tip-sheets (that could be posted on a fridge with a magnet). They hypothesised that each channel would perform differentially for the total numbers of people reached, the numbers of targeted population it would reach (those most at risk of the disease) and how much people would know about the risks as a result of receiving information. They found that tip-sheets had the best reach, newspaper coverage was most effective at targeting higher risk audiences and that newspaper coverage was most associated with knowledge gain, closely followed by TV public service announcements. The campaign ran for five years and received substantial publicity. As such the researchers made no attempt to test whether there were significant differences between the delivery channels. This is an important factor for studies of multiple channels. A researcher must be confident that there is little chance of a participant reporting the effects of receiving communication via a particular channel to have been influenced by another.

The learning to take forward from these two studies for the research in this thesis includes what to expect from different communication types and the importance of experimental re-creations of channels accurately reflecting their theorized characteristics. The research design will also address the potential overlapping influence of multiple channels.

3.5.1.2 Experimental problems

Some studies reviewed reveal the problems that can arise in an experimental or laboratory-style study. Burgoon *et al.* (2002) took forward the earlier assertions of Pfau and others that face-to-face or interpersonal communication might represent a superior method of communication. They broke down the format of interpersonal communication into five modes with differing levels of face, voice or text only contact. Students were randomly assigned to one of the five modes and given a task to discuss. Communication was judged successful according to how much agreement there was between the respondent and the communicator over decisions made as part of the exercise. Researchers found no significant differences between the communication modes. The most face-to-face format, or mode, was seen as easier by respondents, but those corresponding by text produced the most agreement on decisions. The researchers acknowledged that in order to make the experiment practical they concentrated on a short-term and straightforward decision-making task. They

acknowledged that different types of tasks and communication goals might produce different results. This illustrates how a channel comparison study designed to achieve what was described by Evans (2008) as the gold standard of evaluation research runs the risk of finding results which are isolated to a narrow range of applications and inappropriate for assessing complex behavioural decisions.

Two further studies illustrate the tension between attempting to meet the requirements of rigorous social psychological research and conducting field studies to capture effects with real populations and real, complex situations. While audiences can be randomly sampled or assigned it may still not be possible to detect differential effects according to different communication modes. In a study to assess whether personalised health information could be provided without expensive face-to-face meetings (Marcus *et al.*, 2007), previously sedentary adults were recruited by use of newspaper advertisements and internal advertising via a major employer. They were assigned to either a telephone, print or a control group (offered participation after the research was complete). All groups logged their physical activity during the study period and all groups reported an average of between 19 and 20 minutes a week of moderate intensity, indicating no difference between either method of communication or those in the control condition. While this study was able to randomly assign people to the activities being compared, it could be argued that as everyone taking part in the study was self-selecting (by responding to recruitment advertising) all carried some motivation with them to exercise and to accept cash inducements of up to $100 upon completion. The study highlights in practice the problem outlined by Evans (2008) and Snyder (2007) that comparative studies have small effects sizes because all groups take action. It appears that in this case this may even have been true for the control group.

Werner, Sansone and Brown (2008) built on an earlier quasi-experimental investigation (Werner, 2003; Werner & Adams, 2001) to examine the impact of information about toxic substances in the home delivered via group discussion or a traditional class lecture. High school students were randomly assigned to either group discussion or lecture. Results supported the hypothesis that group discussion was more effective than class lecture, especially for females. The researchers reflected that a less clear result for males may have been due to low numbers or possibly the topic of discussion. What is clear is that improving the rigour of the second study by including random sampling introduced new problems. While the experimental setting created the opportunity for random sampling, a comparison group and the ability to ask many more detailed questions, it also involved engaging teenagers in a debate unlikely to have as much resonance as the 2003 study. The earlier

study engaged adults with home responsibilities meeting in social groups such as church groups, garden clubs and neighbourhood centres.

3.5.1.3 Quasi-experimental problems

Two more studies illustrate how attempting to satisfy criteria for social psychological research can prove difficult in real world settings, but also how if the real world setting is removed, new problems are created. A quasi-experimental design was used to see if there were differences in assignment marks for postgraduate nursing students depending on whether they participated in face-to-face or online discussion seminars as part of a research methods module (Campbell *et al.*, 2008). A statistically significant improvement was found for students learning online, although the researchers acknowledged the result did not take into account alternative explanations. One potential reason for the difference is that students chose which type of class to take, and more committed and able students may have been drawn to the online option.

Citizen's juries and citizens' workshops were compared as participation techniques by empirical study using random assignment and a pre- and post- question format (Timotijevic & Raats, 2007), two features reviewed earlier in this chapter as offering more rigour to social science research (Evans, 2008; Snyder, 2007). Participants were recruited from the same pool of residents and allocated to either a workshop format or a citizens' jury event. Participants evaluated the processes for trustworthiness and fairness and also for personal outcomes, such as self-reported changes in feelings of empowerment. Actual outcomes could not be assessed due to the experimental nature of the research (it was a research exercise not a real consultation). There were no statistically significant differences between assessment of the participation methods except on one criteria – trust. The workshop, which had included testimony from expert witnesses, was judged less trustworthy than the jury activity. Researchers suggest this was linked to their observations of scepticism in both groups over the academic nature of the exercise. Other issues noted with the research design were that the type of people volunteering to participate were not representative of the population and that the offer of incentives to take part may have made participants less likely to criticise the event. Timotijevic & Raats (2007, p. 317) acknowledged a key problem was that they had "plucked" the process out from a genuine context of attempting to engage people While the researchers set themselves the goal of producing an empirical study of two different methods using a pre- and post- format, the outcome appears to have been affected by the validity of asking participants to suspend reality.

The experience of Burgess *et al.* (1998) is also of direct guidance for this thesis. The researchers compared how councillors and officers of two different European cities viewed the prospect of engaging the public over sustainability. They chose Nottingham in the UK because it was an early adopter of participatory concepts emerging from the Earth summit in Rio and an enthusiast for involving the public. Eindhoven in the Netherlands was chosen for its management culture and top-down approach to planning and delivery of services. The researchers concluded that there were several differences between the two cities and that comparison taking into account so many variables would be complex.

3.5.1.4 Missing the communicative element

Two field studies illustrate the value of attending to the communicational element of an intervention. Interventions in three different communities assessed the effectiveness of measures to encourage the women of the community to make a series of targeted health behaviour changes (Lucumí *et al.*, 2006). Participants in all three communities received a 16-week programme of classes lasting two hours per week. Two of the communities received additional interventions including participation in brisk walks and the engagement of their family members in the programme. The third community received yet further support in the form of additional contacts and home visits. Although the programme resulted in statistically significant behaviour change, there was no significant difference between the communities. Although they acknowledged social issues were a factor of influence, the researchers did not assess the intervention techniques for how they worked, such as by creating social interaction to change social perceptions. It could be argued that the substantive intervention all groups received was the most effective and along with information and communication it provided a social interaction element. This illustrates that channel difference studies can and should examine both the characteristics of the channel and context issues such as the extent to which deliberation or participation characteristics are present.

Another study was also limited in its ability to discuss how the various techniques used might have operated as successful or unsuccessful communication mechanisms. Carr and Halvorsen (2001) investigated three different types of participatory techniques with different communities. All had an interest in the topic of the participation, public forest management. The techniques were a mail survey, focussed conversations with community groups, and a community dinner with discussion. The activities were evaluated according to whether participants were demographically representative of communities, whether useful

synergies between community well-being and public forests emerged, and whether participants' beliefs and values about forest management were heard. They were also evaluated on one outcome criteria, whether new, better, ways of managing forests sustainably emerged from the activities. The main difference found was that the two group activities outperformed the mail survey at identifying participants' beliefs, values and management issues. The sponsors of the three different activities learned more when they did not set the topics for discussion themselves but opened the issue to face-to-face communication which led to issues not on the organisers' agenda emerging. Carr and Halvorsen's study illustrates the value of also examining such methods through a communication lens. They do not discuss the concept of one-way and two-way communication but the results seem to indicate that there is added value in approaches which offer two-way dialogue. The Carr and Halvorsen study was able to use different locations for their comparative study and circumvented the problem experienced by Schooler *et al.* (1998) in trying to compare channels in use at the same time in the same geographical location. This is a technique addressed in the research design reported in this thesis (see Chapter Six, section 5.6).

3.5.2 Review summary

The fields of research evaluating communication and participation approaches have both offered substantial guidance in isolating what features to study and how to study them. Research design issues have been addressed throughout the review. The review has also shed light on the assertion made in the first chapters of this thesis that the optimum type of communication is two-way, and the difficulty in assessing this. Marcus *et al.* (2007) found that neither personalisation of information nor a human voice giving out closely scripted information made a statistically significant difference. Pfau (1990) reflected that the experimental format used meant that interpersonal communication in effect operated as a one-way channel. Other studies which compared discussion formats (Campbell *et al.*, 2008; Werner *et al.*, 2008) found approaches which appear to have more bottom-up characteristics had more impact. The aim of this thesis is to determine whether bottom-up methods perform better than top-down methods, and, while the review offers some evidence for this, it also identifies many challenges.

3.6 Chapter summary

Three broad issues emerge from this chapter which influence the focus of this thesis: which of the many evaluation types and focuses available is appropriate; methodological challenges of comparative evaluations, and the role of theory in guiding an evaluation.

This chapter has explored the various types of activity that are conducted under the umbrella term of evaluation. Balch and Sutton (1997, p. 62) say that communication evaluation research put simply can address one of three questions: "What should we do? How are we doing? Did we do it?" The nature of study appropriate to answer the type of inquiry set out in Chapter One matches the final question in the list, "Did we do it?" What is appropriate here is an outcome evaluation. This resonates with a criteria for participation evaluation set out by Rowe and Frewer (2005) who argue that when assessing mechanisms for communication, an appropriate evaluation of effectiveness is whether the medium allows recipients to fully understand the information communicated. It is clear that evaluation of both participation and communication studies can feature outcome as a measure. In communication studies this can be specified as knowledge, attitude or behaviour. The identification of communication variables and receiver variables will inform the selection of the appropriate theory to underpin this inquiry and this is taken forward in Chapter Five. The concept was also introduced in this chapter that communication variables may not have direct effects and that combinatorial theories provide assistance in explaining a more complex process for the way in which communication variables affect behaviour. This is also explored further in Chapter Five.

This chapter also discussed the tensions between the requirements of traditional social research and the demands of evaluations in the field which need to offer useful feedback to campaigns in order that they are improved. A review of studies, as documented in the previous section, provided several guides to the formation of an appropriate research design. The path chosen in order to produce appropriately rigorous social science evidence of effects from on-the-ground attempts to change behaviour which vary in their communicative approach is set out in Chapter Six.

The role and use of theory has also been discussed in terms of how it is built by rigorous social science-based inquiry in order to offer practitioners in the future a guide to what should work and how. The study in this thesis is a theory-based programme evaluation in which established theory will be used to identify measurement variables (Stufflebeam & Shinkfield, 2007). There is criticism that such a long-term perspective can sometimes offer

only historical record (Balch & Sutton, 1997) of a campaign which when repeated with new contexts, audiences and issues, fails to operate in exactly the same way again. Measures to limit variables to help improve prediction are discussed in Chapter Five. It is argued that such an inquiry is of practical use to campaigns and activities run on an annual or recurring basis. In these situations an outcome evaluation can be fed back to organisers in order to inform decisions about future activities (Fairchild, 2001). In this way it is argued this study seeks both to prove and improve (Stufflebeam & Shinkfield, 2007).

The literature in this chapter has led to the identification of the third key objective of this thesis:

3. *To generate a theory based evaluative framework about the effectiveness of communication activities for policymakers, practitioners and the social science community. Particular focus will be on development of a clear and replicable methodology for comparing different communication strategies.*

Salovey and Steward (2004) describe the testing of a theory of behaviour in an applied setting translational research. They argue it is an appropriate function of social psychology to move between research which develops theories in laboratory settings and research which tests their usefulness in addressing real world problems. The approach taken in this thesis is that by seeking an understanding of the core elements of communication, persuasion and social change, which are at the root of all six activities to be studied, a useful comparative evaluation can take place. Plus, the intention of the research in this thesis is to create a study that helps identify 'what works' that would be quite straightforward to replicate in other studies of communication campaigns. In this sense it is designed in the spirit of advice from one of the founders of the discipline of social psychology Kurt Lewin (1951, p. 169), in that applied researchers should realise there is "nothing as practical as a good theory".

4 Activity selection process

> *…their true worth is not measured by the degree people like them or whether implementers 'feel' a campaign has succeeded but, rather, in the program's influence on the communities and stakeholders it is created to benefit.* (Valente, 2001, p. 105)

The characteristics of communication approaches and variables which might predict their use was explored in Chapter Two. Top-down was identified as a communication type which is:

- expert-led, paternalistic, authoritarian
- asymmetrical or even one-way
- features scientific persuasion, instructional, transmission of information.

The characteristics of bottom-up as identified suggest a communication type which involves:

- dialogue, negotiation and deliberation
- participation, collaboration, partnership
- involvement in decision-making.

These characteristics were used as a guide to identify examples of bottom-up and top-down communication for use in conducting a comparative evaluation.

Chapter Three reviewed a range of techniques for assessing communication and participation, with studies using qualitative (Burgess *et al.*, 1998; Lowndes, Pratchett, & Stoker, 2001) or quantitative techniques (Abelson *et al.*, 2007; Evans *et al.*, 2009; Noar *et al.*, 2009). While Robson (2002) argues that both methods are appropriate for an evaluation, depending on whether they are interested in the process or the outcome respectively, most attitude research is quantitative (Oskamp & Schultz, 2005) and empirical techniques such as being able to have a pre- and post-question format are preferred when conducting evaluations (Timotijevic & Raats, 2007).

The evaluation conducted in this thesis will also be a test of theory using measured variables and a quantitative approach which, it is argued here, is appropriate to assess the outcome of the process and the outcome of the activity via the dependent variable of behaviour. Chapter Five will describe the research design for the quantitative evaluation in more detail but at the exploratory stage of analysing potential study sites an important

criterion alongside assessing its communication approach was whether it was an activity suitable for the quantitative analysis recommended above. This meant, for instance, that communication activities undertaken needed to have a sufficiently clear focus and also an audience from which to draw participants for a quantitative analysis of findings.

This chapter sets out the work conducted in pursuit of the second objective of the thesis, identified in Chapter One, namely:

> 2. *To identify the characteristics of top-down and bottom-up engagement from a series of case studies and provide a comparative evaluation of the two approaches.*

This work comprised analysis of documentary evidence, interviews with practitioners involved and participant observation at meetings. The chapter concludes by describing the communication activities selected to be the focus of this study.

4.1 Initial study site identification

The approach used to find suitable study sites was to use documentary and other evidence to "learn about the situation" rather than have a pre-established hypothesis (Denscombe & Dawson, 2007, p. 219). An informal search for potential organisations began in 2006. Trade journals specialising in communication, such as *PR Week* and *Profile Extra* were monitored, along with public relations and marketing blogs such as *Greenbanana* and *Greenormal*. The websites and communication activities of organisations working in behaviour change, such as *WRAP*, the *National Social Marketing Centre*, *Futerra* and *The Forster Company* were all visited[8]. Follow-up reviews were conducted of the websites and communication activities of potential target organisations working in behaviour change. The initial criterion was to identify communication activities targeted at environmentally significant behaviours (ESBs) in the UK, in a timeframe compatible with the proposed study. Informal conversations were also conducted using the same criterion with communication professionals working in the public relations sector, employees of potential target organisations and with academics involved with assessing environmentally significant behaviours. Several potential study sites were rejected for practical issues, such as timing of events (they were already underway or the date they might go ahead was unclear), or non-co-operation of potential hosts. From this initial search two organisations

[8] Links to the websites of the online sources listed can be found at http://goodgreenpr.blogspot.com, a weblog of some of the web-based resources accessed during the research (accessed 28 June 2011).

involved in communication about the environment were identified as potentially operating the types of communication characterised as top-down and bottom-up, within a timescale that fitted the researcher's requirement to collect data and where there was enthusiasm for the proposed evaluation. One was a local public authority, Warwickshire County Council, and the other a voluntary action group, Action 21, descended from the Agenda 21 global action initiative adopted by the UN in 1992. The next section briefly introduces the two organisations, before further analysis undertaken to assess suitability is described.

4.1.1 Warwickshire County Council (Switch it Off)

Warwickshire County Council is a unit of local government centrally located in the UK. Among its statutory powers are those provided for in the Local Government Act 2000 which includes promotion of the environmental well-being of the area within its boundaries. The Local Government White Paper *Strong and Prosperous Communities* (DCLG, 2006) proposed to build on these powers and require councils to produce, with others, a Sustainable Community Strategy. Predicting this role, Warwickshire launched its Climate Change Strategy, in partnership with others (including Action 21) in July 2006. Its largest single project, run for the first time in November of the same year, was the Switch it Off (SIO) campaign. The SIO campaign aimed at relatively easy-to-achieve 'curtailment' behaviours[9] of the type described by Abrahamse *et al.* (2005) in Chapter One. The SIO campaign was repeated in 2007, 2008 and 2009, after which Warwickshire County Council revised its campaign to cover new energy-saving objectives[10]. The researcher undertook initial familiarisation with the 2007 campaign and the 2008 campaign was the project studied in this research.

4.1.2 Action 21

The purpose of Action 21 is to promote sustainable living to people in Warwickshire through positive practical action. Projects and activities focus on the issues of food, re-use, transport and energy. Among its goals are to promote protection and preservation of the environment and educate the public on these topics. The organisation was established in 1996 as an Agenda 21 group in response to the international Earth Summit in Rio de Janeiro. It is a social enterprise governed by a board of unpaid volunteer directors. Funding

[9] Personal communication, Ms. L., September 5, 2007.
[10] Personal communication, Ms. C., WCC, January 11, 2010.

includes self-generated income, statutory funds, charitable trusts and membership fees[11]. At the time of the preparatory work for this study the organisation was involved in a range of projects including an allotment project training interested people to grow their own food, a scheme to encourage people to measure their carbon footprints and another to provide training on environmental issues to volunteers so that they could pass on their knowledge in their own communities.

4.1.2.1 Shared location and status

The SIO campaign was a shared campaign between Warwickshire County Council and two other local authorities, Worcestershire and Coventry (a fourth partner was Warwickshire Energy Efficiency Advice Centre). Two factors prompted a decision to focus on the SIO campaign as conducted in Warwickshire, and not to gather data in the other two counties. The first was that Warwickshire County Council and Action 21 share locations. It will be recalled from Chapter Three, section 3.4, that attempts to compare approaches can be hampered by the different cultures and contexts of study locations in different settings (Burgess *et al.*, 1998). The second factor influencing this decision was that, as described above, the Warwickshire council and Action 21 are both members of the steering group for Warwickshire Climate Change Partnership, giving credibility both with the public and with each other as being actively engaged with climate change despite their differences in size and resource levels. This latter provision was considered important as both host organisations were aware of the comparative nature of the study and needed to feel any comparison made was with a credible enterprise.

4.2 Identifying practice from the literature

Although the organisations seemed to be *a priori* candidates for a comparative study, further work was required to assess whether the organisations were practicing the types of communication identified as top-down and bottom-up. This section will detail the methodology adopted to do this, following guidance from Grunig and Grunig (1992) that communication approaches could be identified by qualitative assessment of artefacts, interviews with practitioners or observation of activities. The underlying mechanisms of activities are also identified in the participative literature (e.g. Blackstock *et al.*, 2007; Rowe & Frewer, 2005)

[11] www.action21.co.uk/about.html accessed May 28, 2010.

4.2.1 Methodology

The organisation's websites were reviewed for evidence of top-down or bottom-up characteristics as listed in this chapter's introduction. Key data reviewed included information about the management structure and governance of the organisation, documents on climate change communication policy and strategy and examples of communication activity.

This overview identified key specialists and helped form interview questions to explore the communication activities being conducted. Denscombe and Dawson (2007, p. 175) identify interviews as appropriate for research when the information sought is from "key players" who can provide insight into a situation which others cannot; in this case to assess whether communication practices matched the top-down and bottom-up approaches found in the literature review. Semi-structured interviews were used to balance having a clear list of questions to be addressed but being flexible in allowing the interviewee to expand and speak freely in their own terms about the subject. Four interviews were conducted between June and September 2007. Three were conducted face-to-face and one by telephone. All were recorded on cassette tape and transcribed by the researcher shortly after each interview. Field notes were also taken during the interviews. Three of the interviews were conducted with one organisation and one with the other; this reflects the relative size of the organisations and the scope of their communication activities. The council activity it was proposed to investigate involved several departments of an organisation with 8000 employees (19,500 including schools). Action 21 was considerably smaller, with at the time just three full-time employees.

4.2.2 Interview analysis – Switch it Off

Three people were interviewed, the head of the unit leading the county council's delivery of its climate change strategy, the member of that unit doing most of day-to-day work organising SIO who also had specialist communication knowledge, and a member of the council's press office.

A comment from one of the organizers of the proposed study sites illustrates the expert characteristics that Kim (2005) ascribed to asymmetrical communication campaigns:

> *There are hundreds if not thousands of actions we could do. So we developed a carbon hierarchy, what sort of things we should be doing first in Warwickshire, and in what order. And at the top of the list was raising awareness of how much energy is wasted. At the time I was the only one working on the climate change strategy*

> *and I had to do everything. And when there's only one person doing something that person has some decisions to make.* Ms. L., WCC.

A colleague with specialist communication knowledge justified the asymmetrical stance of the campaign, saying the organisation was not prepared to accommodate the notion that inaction was acceptable.

> *I agree it's an asymmetrical campaign, it's got to be one of persuasion. That's what we want ultimately, people to change their ways. It's not negotiable that they keep polluting, or adding emissions. Ms. R., WCC.*

This is in line with the observation by Cancel *et al.* (1997) that it is not always ethical to adopt a symmetrical approach, such as if it means compromising morally-held principles. It is, however, at odds with Dervin and Frenette's (2001, p. 71) description of a successful sense-making approach which would involve a genuine "dialogic spirit".

This interviewee went on to describe something that Dervin and Frenette might have used as an example of the 'sheer transmission' especially in quantity, of one-way information:

> *…there's one single message being pushed through but in a different range of vehicles so you're getting a kind or ripple effect, you've got lots of things getting different media at different times so we're not getting one hit you're getting, it's like the rain coming on you're getting lots, you're getting pelted by the rain. The SIO campaign is pretty much like that I think. We've had coverage right through from last September [2006] through to April [2007], which is phenomenal, when you think about it.* Ms. R., WCC.

Another colleague who worked principally on the media relations aspect of the campaign agreed that it was deliberately persuasive:

> *The SIO campaign is … an education campaign to try and change people's attitudes in the home on a very basic level.* Mr. L., WCC.

This concurs with asymmetrical communication described by Huang (2004) as a tool to change attitudes, behaviours or cognitions.

The main protagonist of the Warwickshire campaign had an energy rather than a communication campaign background. She spoke of wanting to ensure what her organization did was modelled on the format of other similar campaigns:

> *Once we'd decided we wanted to communicate how much energy was wasted from standby lights, one of the first things we did was look at what other campaigns had done. We needed to decide what to call it… turn it off, switch it off, the big switch off… so we did web searches on all sorts of other campaigns that had gone on around the world, making sure there were no copyright issues.* Ms. L., WCC.

This indicates the campaign was modelled on those of other formats. Given the majority of researchers have found little evidence of symmetrical campaigns (Leitch & Neilson, 2001), this suggests the campaign was based on an asymmetrical format.

Audience opinion *did* help frame the message in a way that Dervin and Frenette (2001) described top-down communicators using when they want to increase effectiveness by tailoring messages to community concerns. One organiser described how the expert opinion was tested for its resonance with the public in January 2006 by questions to a citizens panel:

> *…and it came back overwhelmingly … something like 76%... saying they were concerned or very concerned about climate change.* Ms. R., WCC.

In summary it appears that while the council's overall approach to their campaign features a largely top-down stance, its topic of what to communicate about was as a result of citizen concern and demonstrates a two-way flow of information.

4.2.3 Interview analysis – Action 21

While the council has status as a local *authority,* Action 21 sees itself as being about community ownership, as identified by and illustrated by the interviewee's comment on how Action 21 was directed:

> *We try to make sure that the people themselves are major stakeholders. You can't ignore funders, but we try to make sure we take people into account. Our board of directors are all volunteers, because we are a not-for-profit company they have to be volunteers. We have three full-time staff and three part-time staff and 40 to 50 active volunteers so that might say where the direction is coming from.* Ms. S., Action 21.

Bracht and Tsouros (1990) argue that community ownership is a characteristic of participation, with communities shaping their own directions. The interviewee went on to illustrate how one of the projects in which her organization was involved had come from an idea from a volunteer, with the full-time workers tasked with how to fund it:

> *That's an example of an idea which was formulated by one of these theme groups and is now going ahead.* Ms. S., Action 21.

She also discussed another project in which volunteers would receive training on environmental issues, but once trained the volunteers would decide how to pass on the information in ways they felt appropriate. Her emphasis was on the role of Action 21 in providing facilities to make activities happen, but that those engaged were free to take forward their new skills or knowledge according to their own agenda. The interview suggested that Action 21 was, as an organisation, demonstrating bottom-up characteristics,

though specific communication approach required further investigation. Such investigation was required because, if the work programme of Action 21 was driven from the bottom-up, interviews with identified 'key players' might not be successful at identifying the underlying approach of its communication activities. The selected key player in the case of Action 21 indicated that the insight sought (about communication approach) was less identifiable from interviewing someone according to job role or position and more likely to emerge during meetings analysis.

4.2.4 Meetings Analysis – Switch it Off

In order to triangulate the evidence emerging from interviews, meetings held by the organisers of the target communication activities were attended. The aim of meeting attendance was to act as observer-as-participant, with no part taken in the meeting but for the researcher's role (as a future potential evaluator of the campaign) to be clear to all other participants (Robson, 2002). Monthly meetings of the SIO organising committees were observed on three consecutive occasions in spring 2007. Field notes were taken during the meetings but none were recorded. The focus was on the characteristics of communication approaches and the relative importance attached to them by the organisers.

SIO Media Coverage - It was clear that media coverage was seen as vital in the six week build-up ahead of and during the campaign. Media coverage appeared high on each meeting agenda, resulted in actions by more than one team member in meeting minutes and was discussed in some detail during meetings. (An example of media coverage achieved is reproduced in Appendix 6). It will be recalled that Rowe and Frewer (2005) identified media publicity as top-down information provision, with the characteristic of a one-way flow of information (see Table 2.1).

SIO Volunteers - Volunteers were sought from within the local authority to informally monitor energy usage in their work areas during the campaign, put up posters reminding people to switch off, reduce their own energy consumption and encourage others to do the same. Discussion revealed that this was seen as an important activity because the councils must be seen to be acting alongside urging others to act. It appeared to require less time to implement than media coverage as staff had contact lists for interested personnel. There was no discussion of staff interpreting the material. It was clear that members of the meeting felt that the volunteers would be acting in the role of temporary members of the SIO team and convey the SIO messages.

SIO Universally Challenged - The council invited secondary schools to participate in an inter-schools quiz based loosely on the University Challenge TV programme. The final event, involving six schools from around the county, would ask participants questions which tested their knowledge about the SIO campaign as well as other environmental issues.

SIO Bag Giveaways - Council staff and partners from Warwickshire Energy Advice Centre held town centre giveaways of SIO branded 'life' bags containing free energy saving light bulbs and SIO energy saving literature. The giveaway was seen as a helpful device to engage shoppers in a conversation about their own energy saving.

Other smaller-scale activities were discussed in meetings, such as encouraging restaurant owners to hold dinner by candlelight evenings on the final night of the campaign week. These were ruled out of the study for practical reasons of data collection.

4.2.5 Meetings Analysis – Action 21

Action 21 was organised differently to the SIO project, in that there was no central theme but several separate activities. Each activity was independently organised. Practical research considerations also had an impact, in that some potentially good examples of participatory processes, such as an allotment project, were already well-underway. Two new projects were identified and meetings were attended. As with the SIO meetings attended, the purpose was to find out about activities but not to take an active part.

Three preparatory meetings were attended between January and April 2008 at the start of a new project to recruit and train volunteer members of the public as green champions. Again, notes were taken rather than recordings. The first meeting was held in a church hall and was formal with presentations. The second and third were in public houses and were an opportunity for potential volunteers to share ideas on how they thought their role should develop and to discuss these with the full-time staff.

Practical difficulties for data gathering emerged, when it became clear that volunteers had very different ideas for how, and the extent to which, they would put their training to use. It was clear that these presented a threat to quantitative data collection and comparisons with other communication activity; the communication activity could not be clearly identified, regardless of top-down or bottom-up mode. Action 21 staff, concerned to support the volunteers, suggested events the new champions might attend on the organisation's behalf

and one of these, the Leamington Peace Festival, represented an activity compatible with quantitative data collection.

Action 21 stall, Leamington Peace Festival - Leamington's 30th peace festival was on June 14 and 15, 2008. It was held at a pleasant central location in the town within short walking distance of the main shopping area. The event attracted a mix of people including those who visit each year and one-off visitors who incorporated it into their visit to the town centre. Action 21's green champions had a stall at the festival to promote sustainable living options to visitors to the stand. During planning of this event it was agreed by the champions that visitors would set the agenda about the topic they would discuss, as long as it was within the remit of Action 21. As a result, decisions about what advice to seek and what, if any, action to take as a result, were to be made by visitors to the stall.

Action 21 Renewable Energy Club - As part of the preparatory phase of research, one meeting was attended of another Action 21 project just getting underway, the Renewable Energy Club. The club was formed by three members of Action 21 who were keen to install renewable energy in their home and wanted to share their experiences and develop their skills with other like-minded people.

As with the peace festival, it was clear that the agenda for the Renewable Energy Club was set by participants themselves. From a study of previous agendas and attendance at a meeting it was clear that the format of meetings was very democratic, with a founding member of the group chairing by mutual agreement, with emphasis on managing the meeting rather than the discussion. Everyone at the meeting had an opportunity to make a statement at the beginning and also to comment freely throughout. The club started in December 2008 and at the time of research had about 75 people registering interest. It will be recalled that Rowe and Frewer (2005) described a self-selecting group of people coming together to discuss an issue as an example at the opposite extreme of public consultation to media publicity, or a more bottom-up method of participation. The renewable energy club's meeting format also compares well with the description of participative approaches by Bass *et al.* (1995), that the most participative types of approaches have features such as issue analysis, participant consensus and involvement.

4.3 Results - organisational or activity level investigation?

Warwickshire County Council and the Switch it Off campaign it initiated was initially selected on the *a priori* judgement that it was an organisation practicing top-down communication. Action 21 was selected as an organisation which appeared to be operating a

more participative philosophy characteristic of an organisation practicing bottom-up communication. However, when the details of activities that each was undertaking were reviewed for characteristics and discussed with organisers, it became clear that both groups were operating a range of communication approaches and both saw this as positive. For instance, although the Action 21 stall at the peace festival permitted visitors to set the agenda on what was to be communicated about, the purpose of the organisation and the event was to educate and empower people to change their behaviour, suggesting some of the characteristics of top-down communication. The SIO bags handout had very similar characteristics to the peace festival event, the only difference was that the SIO bags handout had a clearer, tighter message. It involved engaging people in a conversation about energy use. Also, although mechanisms like the use of media coverage are identified as a one-way flow of communication (Collins *et al.*, 2003; Downing, 2007; Kollmuss & Agyeman, 2002; Owen, 2000), it was discovered that the information supplied in the material, indeed the whole of the SIO campaign, was built in response to citizen concern expressed via a citizen's panel, a mechanism more likely to be associated with a more participatory or bottom-up mode of communication (Abelson *et al.*, 2003; Rowe & Frewer, 2005).

While the initial intention had been to compare the two organisations, the evidence from interviews and meetings discussing the activities indicated this was too simplistic. It was more likely that each organisation was operating a range of communication styles, which concurs with Murphy's (1991) analysis of what many organisations do in practice. Plans to compare activities at an organisational level were therefore revised, and it seemed more appropriate to analyse at the activity level.

4.4 Activities summary and initial participant descriptives

A summary of the settings of the six activities, selected for their different approaches, is supplied in Table 4.1. The activity representing the top-down characteristics of expert-led transmission of information is at the top of the table. The activity at the foot represents most fully bottom-up characteristics – using dialogue, collaborating and exploring issues from the perspective of participants' own needs. The position of the activities listed in the middle of the table is suggested, as while it was clear they represented communication approaches not at the extremes of the top-down bottom-up continuum, it was not possible to judge from the evidence precisely where on the continuum they should be placed. (A summary of the data collection process can be found in section 5.10.1.)

Table 4.1. Summary of communication activities studied

Activity acronym	Description of activity and level of participation
SIO media	Participants read a two page article from their local newspaper which summarised the aims of the Switch it Off campaign and gave examples of how to save energy.
SIO univ	Teams of secondary school children (age 12-13) competed in an inter-schools 'Universally Challenged' competition which included questions about energy saving and content of the Switch it Off campaign.
SIO vols	Local authority employees volunteered to act as champions within their organisation, supporting the Switch it Off campaign by reducing their own energy use and encouraging colleagues to do the same.
SIO bags	Participants were approached in town centres and given a 'bag for life' shopping carrier containing energy saving light bulbs and literature while being engaged in conversation about the Switch it Off campaign
A21 peace	Participants approached volunteer advisers operating a stand at a peace festival in the locality. They chose the topic(s) of interest to discuss from home energy saving, locally grown food, recycling and/or transport.
A21 REC	These participants joined a renewable energy club set up to assist members adapt their homes to be more fuel-efficient/run on renewable energy. Typical projects included loft insulation, installing and running wood burning stoves and installing solar panels.

SIO: Switch it Off; A21: Action 21; REC: Renewable Energy Club

4.4.1 Sampling and representativeness

The two populations of interest are citizens of Warwickshire targeted by the communication activities of either Action 21 or Warwickshire County Council.

Action 21 operates in the heart of Warwickshire but its mission extends to surrounding areas. The whole population was technically accessible and sampling frames listing good samples of the population could have been accessed. It was also required to take into account that the activities being researched were quite small scale and such an approach could have resulted in surveying a high number of respondents not reached by the activities. It is the effectiveness of these activities that is the focus of this study. In order to capture people from the populations of interest definitely exposed to a particular activity, participants were chosen on a convenience basis just after the persuasive communication had been delivered. A control group was considered but the specific nature of the questions (i.e., requiring evaluations of the activity) would have been meaningless for control group participants to complete.

In an attempt to partly stratify the sample, data on the age and sex of the participant were gathered to compare with the demographic make-up of the county. For four of the activities there was no flexibility in the choice of participants. For two of the activities there was limited flexibility, and where this was the case, participant selection was made on the basis

of trying to stratify the sample. This was the limit of any selection procedure by the researcher. Table 4.2 shows the sample segregated into age and gender groups. For each group the percentage of the sample is shown, and compared to the percentage of this group in the Warwickshire population (ONS, 2001).

Table 4.2. Age and gender of participants for each activity, plus sample and population match

	10-20	20-29	30-39	40-49	50-59	60 or over	Total	Total male	Total female
A21 peace	4	3	4	8	8	4	31	17	14
SIO vols	0	4	6	11	10	2	33	15	18
SIO media	34	0	0	0	0	0	34	0	34
SIO bags	1	2	7	2	5	18	35	14	21
SIO univ	30	0	0	0	0	0	30	13	17
A21 REC	0	0	5	6	7	18	36	22	14
Total	69	9	22	27	30	42	199	81	118
% of sample	34	4.5	11	13.6	15	21	99+**	40.7	59.3
% of population*	14	12.8	17.5	15.8	16.1	23.7	99+**	48.9	51.1

*Under 10's and over 90's excluded **Percentages rounded to nearest decimal
SIO: Switch it Off; A21: Action 21; REC: Renewable Energy Club

Participants under ten and over 90 years old were not directly targeted by the activities and are not included in the comparisons. Under 20's were over-represented due to two activities involving school children. The 20-29 age-group is under-represented, and this is thought to be reflective of the limitations of the activities being analysed in reaching this age group[12]. The gender balance favours females, and this is due to one activity involving solely females.

From a total of 199 participants, 132 took part in the four Warwickshire County Council's (WCC) Switch it Off (SIO) activities, and 67 in the two Action 21 (A21) activities.

4.5 Chapter summary

This chapter has used the literature review on communication approaches set out in Chapter Two as a tool to identify, in the field, activities which represent top-down and bottom-up engagement types in order to be able to conduct a comparative evaluation. Interviews and participant observation were used to triangulate, or get a "fix" on the literature from more than one type of source (Robson, 2002, p. 371). This resulted in the focus of this thesis being an activity level assessment rather than at the level of the organisation. Use of the

[12] Personal communication, Ms L, WCC, 5 September, 2007.

literature gave clarity over which activities appear to be at either end of the top-down bottom-up continuum but was not able to clarify the exact position on the continuum of activities which fall nearer the centre. This is a theme which will be revisited in the discussion in Chapter Six (section 6.2.4).

Earlier chapters referred to debate over the use of persuasive communication campaigns as a type of intervention. Intervention is defined by Hardeman *et al.* (2002) as the use of behaviour change methods to support behaviour change; persuasive communication is one type of intervention, other intervention types include increasing or rehearsal of skills, goal setting, modelling, planning and social encouragement and support. While the six communication activities selected to be the focus of this thesis study clearly involve persuasive communication as defined by being either written materials or opportunities to engage in discussion, they are not referred to as interventions. Although they appear to fulfil the criteria of being activities to support behaviour change, the word intervention is too suggestive of a top-down approach where an expert persuades a non-expert to change behaviour. A more appropriate term for the events set out in this chapter is to refer to them as activities and this is how they will be referred to throughout the rest of this thesis.

5 Evaluation Research Design

> *Only when we understand underlying general principles of communication, persuasion and social change and the relationships among the components of a campaign can we properly design and evaluate campaign efforts.* (Maruyama, 2004, p. 428)

Previous chapters have focussed on the differences between communication types and also on the challenge of making comparisons. The role of theory was briefly introduced in Chapter Three, when it was argued that it isolates the core variables associated with change induced by communication campaigns (Maruyama, 2004). The role of theory then, is to go further than answer standard evaluation questions such as "Did we do it?" (Balch & Sutton, 1997); it is to attempt to answer questions such as *how* change occurred and in *what* conditions. This chapter will identify appropriate theories, review how they have been used by previous studies, and justify their combined use in the research reported in this thesis.

The aim of this research is:

- *to contribute empirical evidence as to whether bottom-up methods offer a better way to change behaviour than top-down approaches.*

This aim is achieved by grouping the data according to the six activities from which it was collected. This enables the differential performance of the different activities (groups) to be assessed. The theoretical variables of the Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986b) and the Theory of Planned Behaviour (TPB) (Ajzen, 1991, 2005) will be used as measures, to see if these explain any difference.

The first section of this chapter indicates how the two theories chosen to assess the communication activities are suited to the task. It also addresses their respective roles in assessing the effect of communication on behaviour and reviews their use previously in behaviour change contexts similar to those investigated in this thesis. It also reviews how the theories' respective variables have been measured.

Further sections set out the hypotheses to be tested in this thesis, detail the research design, piloting, initial data analysis and choice of analytical tools.

5.1 The *when* and *how* of communicating to change behaviour

Devine and Hirt (1989) believe that the key to successful campaigns is to understand the processes that lead to outcomes and they argue that social psychology's persuasion theories should be harnessed to this end. They review two broad approaches to researching behaviour, message-based and behavioural-based. They argue that message-based research is optimum for when the message is the main focus of the campaign and a behavioural focus is best when there is no message focus. In the case of the former, the message is thought to change attitudes which then go on to lead to behaviour change. In the latter, the behaviour is tried first and this may lead to a change in attitude. An initiative to employ a behavioural focussed behaviour change might be to have someone have a positive experience of trying a behaviour, which may then lead to a change of attitude.

When attempting to evaluate a communication campaign, message-focussed research is appropriate. Devine and Hirt (1989) offer the ELM (1986a; 1986b) as a theory capable of being applied to communication campaigns. They argue it addresses both whether and how communication exerts influence on attitudes. Devine and Hirt (1989) also point to a flaw in information processing models like the ELM; they fail to test the assumed links between changes in attitude and changes in behaviour. The researchers argue that if models like the ELM are to be useful to people designing campaigns, this gap needs to be addressed.

The TPB addresses this gap, in that it gives a theoretical account of how attitude (ATT), subjective norm (SN), perceptions of behavioural control (PBC) and intentions combine to predict behaviour (Rutter & Quine, 2002). Armitage and Conner (2002) outline how a persuasive communication might trigger either a new or changed belief about a behaviour. The consequences that may follow are changes in attitude toward the behaviour, in intention and in behaviour.

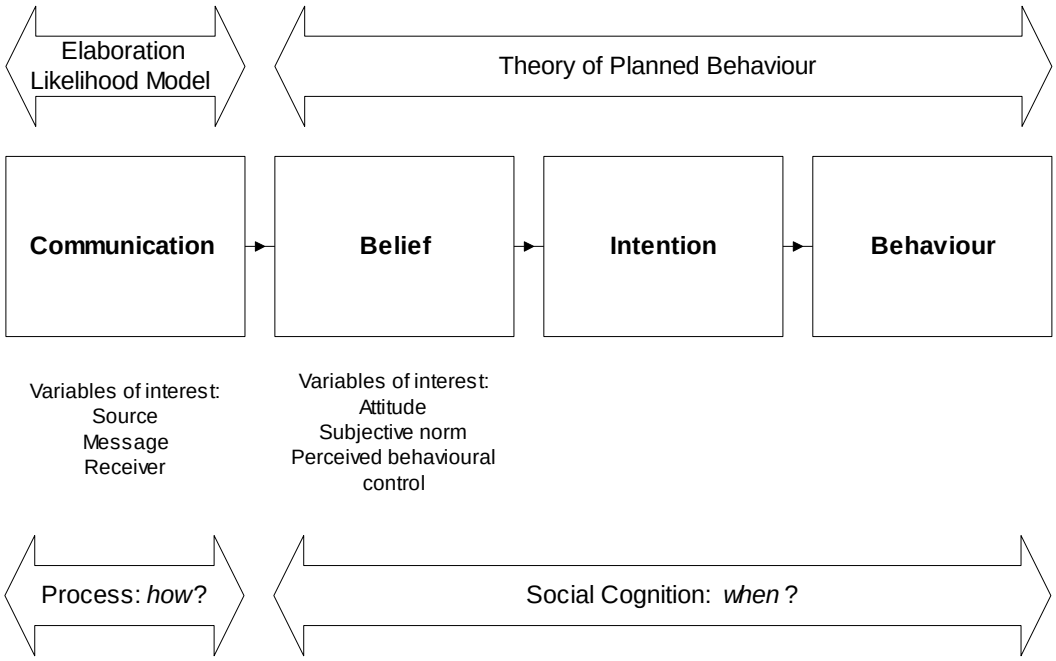

Figure 5.1. Model showing broad relationship of ELM and TPB.

The ELM is a process model, offering a "framework for organizing, categorizing and understanding the basic processes underlying the effectiveness of persuasive communications" (Petty & Cacioppo, 1986b, p. 125). The ELM addresses variables internal to the receiver, such as motivation and ability to process information. It also assesses variables external to the receiver, such as perceived quality of the message and rating of the source of the message. The TPB is described as a social cognition model, as it is concerned with understanding our thought processes as we make sense of social situations and stimuli (Oskamp & Schultz, 2005). As shown in Figure 5.1, this makes the TPB and ELM suited to a study of communication intended to encourage people to cognitively engage with a topic. The ELM can be used to investigate "factors that may increase or decrease the likelihood of a message receiving thoughtful consideration" (Lundy, 2005, p. 267) and the TPB can then be used to assess any resulting alteration in beliefs, intentions and behaviour.

Together they address two key questions in research. Zanna and Fazio (1982) categorise the research process into possible new phenomena starting with *is* questions: *is* there an effect, *is* this a phenomenon? Researchers then move on to *when* questions or ask *in what conditions* does this effect take place, and TPB is categorized as informing this type of research. Alternatively researchers ask *how* questions, such as how different circumstances mediate effects? The ELM is categorised by Devine and Hirt (1989) as answering both *how*

and *why* (for instance, in what conditions?) questions. Zanna and Fazio (1982) advocate that *when* and *how* questions should not be alternative approaches, but asked simultaneously, as data on each set of questions can inform the other. In this study it is argued that knowledge of the social cognition profile can explain communication process effectiveness, and understanding this can further specify the social cognition effects.

Answering *when* and *how* questions demonstrate the value of theory-based evaluation. Answering these questions is of practical use to campaigners in that its use helps uncover not just what is happening, but *why*, a question which many evaluations fail to answer (Abrahamse *et al.*, 2005).

Chapter Three set out how the initial focus of communication research was firstly on models examining variables like source and message, and then on models which looked at behaviours as directed by beliefs. Despite these two dominating ideas about the way of assessing communication, this chapter will document how little evidence there is of combined empirical testing of the ELM and TPB.

5.1.1 Assessing Environmentally Significant Behaviours

Having established that the TPB and ELM might be appropriate for tracking the impact of persuasive communication on behaviour change generally, this section will assess the theories' suitability for an investigation into the behaviours that mitigate climate change.

Stern (2000) categorises the range of causal factors impacting on pro-environmental behaviour into four groups:

- attitudinal factors (e.g. norms, beliefs);
- external or contextual forces (e.g. persuasion or modelling);
- personal capabilities (e.g. knowledge, skill);
- habits and routines (includes availability of time and money).

Stern acknowledges that the different causal factors can interact. Persuasion, for instance (a contextual force), might make someone want to change behaviour but find the practice of the new behaviour difficult (personal capability) or too expensive (habit and routine). As such, studies which investigate one category of variables only may fail to find clear results because of the impact of other types of causal variables. This thesis responds to Stern's call for a move towards combination studies to enable a more comprehensive understanding of the topic:

> *The field now needs synthetic theories or models that incorporate variables from more than one of the above broad classes, postulate relationships among them, and use them to explain one or more types of environmentally significant behaviour*. (Stern, 2000, p. 418)

The TPB is listed by Stern (2000) as one of the theories to have demonstrated its value in explaining how attitude factors affect behavioural intentions (although it will be seen later in this chapter that it also addresses factors from another Stern category, personal capabilities). The ELM examines the impact of persuasion and assesses causal factors from the external or contextual category.

5.2 The Elaboration Likelihood Model

According to Petty, Priester and Brinol (2002) the ELM contributes towards understanding how attitudes are changed by providing a framework for understanding the persuasion process. These authors go on to explain that this understanding can also be powerful for accounting for some unsuccessful media campaigns in which knowledge acquisition has failed to produce attitudinal and/or behavioural consequences, a criticism explored in Chapter One. The ELM framework is useful "for investigating factors that may increase or decrease the likelihood of a message receiving thoughtful consideration" (Lundy, 2005, p.267). The model (illustrated in Figure 5.2) describes how people process information to varying degrees of thoroughness, the depth of processing being a function of motivation and ability. If motivation and ability levels are high, thoughtful elaboration, also called central processing, is more likely to occur (Petty & Cacioppo, 1986b). Motivation is enhanced by personal relevance and ability by level of skill (Mosler & Martens, 2007; Thompson *et al.*, 2007). Alternatively, superficial or 'peripheral' processing can occur; likely to be influenced by cues not central to the message, such as status, credibility, and attractiveness of the communicator (Mosler & Martens, 2007). Both types of processing can lead to behaviour change. Repeated advertising, for instance, may lead to sufficient peripheral processing to prompt purchase of a product, and stronger attitudes may follow once use of it has been experienced (Bitner & Obermiller, 1985). Petty and Wegener (1999) underline the difference between peripheral and central processing and argue that in elaborating, people add something, such as analysis, scrutiny, thoughtful reflection, to the information received. Wegener and Carlston (2005) say that the ELM is therefore about tracking the amount of effort people put into thinking about an issue. The processing type sought for this study is ideally that of central processing, because it is the strongest predictor of thoughtful

behavioural choices more likely for enduring change (Bator & Cialdini, 2000; Devine & Hirt, 1989; Johnson *et al.*, 2005; Olson, 2001).

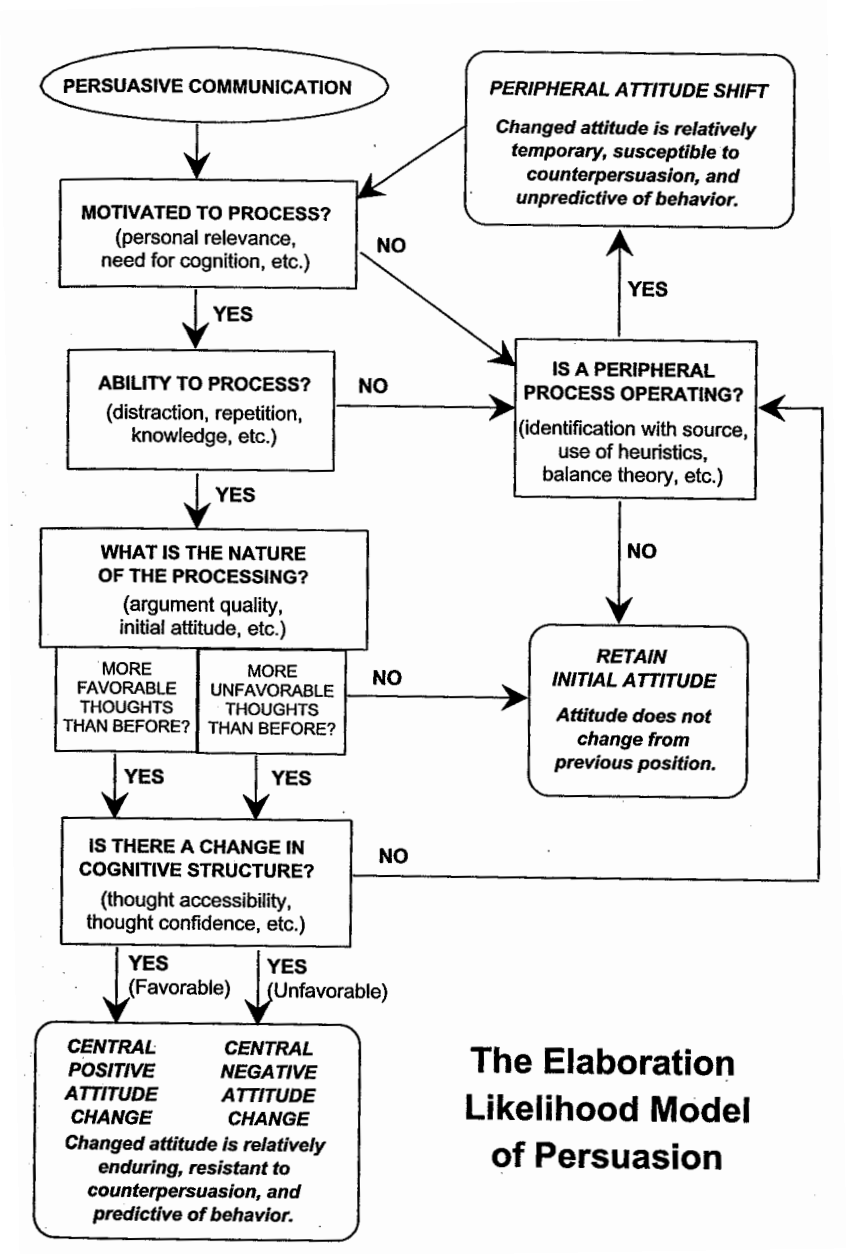

Figure 5.2. The ELM, reproduced from Petty, Brinol and Priester (2009)

Petty and Cacioppo (1986b) state that variables can act as arguments, cues or affect processing, depending on the circumstances. The ability of ELM variables to serve in multiple roles depending on the situation can be a strength (Petty, Gleicher, & Jarvis, 1993); a 'peripheral' cue such as source credibility can become a cue for a respondent to really engage with the topic in the right circumstances, such as a teenager acting as a result of

celebrity endorsement (example from Petty *et al.*, 1993). The challenge is to apply such an all-encompassing model, developed step-by-step in successive experimental or laboratory studies, to an applied study. The context of a particular applied study may mean that it is not possible or relevant to study every conceivable item of the ELM, and this is the practice for many of the studies discussed at the end of this chapter. It should also be noted that the ELM has undergone considerable modification in the more than twenty years since it was first proposed with some of its more ambiguous features revised (Choi & Salmon, 2003).

This study will therefore select interpretations which are most appropriate to the proposed study and which appear to be key elements. This framework is based on the consistently reproduced diagram (see Figure 5.2) of the model of the ELM (Petty & Cacioppo, 1986b; Petty, Heesacker, & Hughes, 1997; Petty & Wegener, 1999) which has five key elements, all of which are capable of being interpreted according to the communication situation being studied.

Table 5.1. Illustration of the operationalization of Elaboration Likelihood Model

Petty and Cacioppo model (1986)	**Description**	**Sha and Lundy conceptualisation (2005)**
Motivation to process	Individual's level of involvement with topic determined by perceived personal relevance.	Receiver factor
Ability to process	Both cognitive power and distractions - is the message easy to read, are there distractions? Does the reader need prior knowledge?	Receiver factor
Peripheral cues	Credibility, likeability of source, length of message.	Message factor
Argument quality	Information in the message which the recipient judges as relevant to them.	Message Factor
Elaboration	Perceptions, quantity and quality of directed thought - measured by whether favourable or unfavourable thoughts predominate and/or by questions about attitudes or behaviours.	Elaboration

Use of these key elements of the ELM is suited to a study of communication intended to encourage people to cognitively engage with a topic (as opposed to drive behaviour by purposefully using the peripheral route) as this is more likely to drive the long-lasting

behaviour change sought. Sha and Lundy (2005) saw the operationalization of the ELM in this way and their conceptualisation is illustrated in Table 5.1 alongside the Petty and Cacioppo framework, with four independent variables, two associated with the recipients of the message, and two with the message.

The next section discusses how these four independent variables and one dependent variable have been operationalized to test the theory.

5.2.1 Operationalizing the ELM

5.2.1.1 Motivation to process/involvement (INV)

Involvement is one of the most important variables in persuasion studies because high involvement is more likely to lead to persuasion (Petty, Cacioppo, & Goldman, 1981). It is central to campaign studies because it mediates attitudes and behavioural responses to messages (Rubin, 1994). In other words communication which is involving attracts more attention and cognitive effort (Pratkanis & Greenwald, 1993). Assessing participants' motivations is described as an "essential step" of developing an effective campaign (Petty *et al.*, 2002, p. 170).

Discussion about how motivated or involved participants are pre-dates the formation of the ELM. Petty and Cacioppo (1979) established the ELM having reflected that high involvement increased the chances of a message's content of being persuasive. They saw involvement as having two elements, the extent to which the issue under consideration is of personal importance, and the extent to which a person estimates the personal rewards resulting from involvement (see also Johnson and Eagly 1983). Personal relevance, involvement and *need for cognition* are described as motivational variables which, when present, "enhance motivation to process issue-relevant arguments" (Petty & Cacioppo, 1986b, p. 149).

Involvement is also a moderator variable; the level of involvement that a person may feel will moderate the level of engagement with the other independent variables of the ELM (Petty, Cacioppo, & Schumann, 1983). This might mean for instance, a person who feels a message is highly involving may cognitively engage with it and change behaviour. A person with low involvement may either not attend to the message or be influenced by other peripheral issues, such as attractiveness of source. Ajzen (2005) points out that this implication of involvement as moderator also impacts on the performance of the TPB, in

that a highly involved person is more likely to change their actions than a person with little interest in the behaviour.

Motivation is frequently tested as a manipulated variable (e.g. Park, Lee, & Han, 2007; Petty & Cacioppo, 1979; Roser, 1990) in that participants are allocated to an involving or uninvolving situation. But when the variable is to be assessed using an evaluation by participants, motivation is typically operationalized as *issue involvement* (Sha & Lundy, 2005); participants are asked to rate their feelings of relevance or involvement thoughts towards an idea or concept after being exposed to a message. Sha and Lundy advise that several question items are summed to provide an index. Braverman (2008) tested involvement using two questions with Likert-type scales; her index had a Cronbach alpha[13] of .72, a value potentially affected by having only two items in the scale.

Zaichkowsky's Personal Involvement Inventory was devised in response to the many definitions of involvement and its measurement (Zaichkowsky, 1985). From a consumer research perspective, Zaichowsky identified that involvement was being assessed in terms of the message and the product (researchers were interested in involvement with the advertisement of a product as well as the product itself). She also identified involvement as being cromprised of three factors:

- physical characteristics of the product;
- personal characteristics of the participant or group investigated (e.g. interests and needs); and
- the situation (circumstances which might increase or decrease relevance).

Zaichowsky's (1994, p. 59) goal was to create a context-free scale focussing on personally relevant issues such as the interests, needs and values which lead to motivation, a scale which would test "the motivational state of involvement". The inventory uses a semantic differential scale. An initial 168 word pairs were narrowed to 20 in initial testing. Others continued to find problems with length (Foxall & Pallister, 1998) and the Revised Personal Involvement Inventory (RPII) was reduced to ten items (Zaichkowsky, 1994). It is argued that these ten items contain an equal mix of items which tap into emotional responses (e.g.

[13] Cronbach Alpha scores measure variance within the item and between other items in the proposed variable (Field, 2005). They offer guidance on the internal consistency or reliability of items, or the extent to which questions making up a scale 'hang together'. The usually accepted cut-off is that alpha should be .7 or higher (Pallant, 2005).

appealing, fascinating, exciting) and rational or cognitive responses (e.g. important, relevant, valuable).

The RPII has been extensively tested and reports high levels of internal reliability, with Cronbach alpha scores of between .85 and .95 (Foxall & Pallister, 1998) and .91 to .96 (Zaichkowsky, 1994). As a result the RPII measure of involvement will be used to measure motivation in the assessment of the ELM in this thesis. Development of the survey materials used in this research is discussed in section 5.8 of this chapter. (A copy of the pilot and post-pilot questionnaires using the RPII are provided in Appendices 2 and 4.)

5.2.1.2 Ability to process (AP)

Ability to process (AP) is possibly the least prescribed of Petty and Cacioppo's factors in the original model outline. The term was initially discussed as the potential for respondents to be distracted from being able to concentrate on the message (Petty & Cacioppo, 1986b). Distractions have been interpreted as both internal, such as anxiety, or external, such as time allocated (Petersen *et al.*, 2000). AP has also been termed 'capacity', and tested by giving one sample an easy-to-read communication and the other sample text with more technical jargon (e.g. Poiesz & Robben, 1996). The construct has been tested as 'knowledge' on the premise that elaborating on the arguments will create greater AP. Defining AP in this way, the concept has been tested using five multiple choice questions to test participant recall (Sparks & Areni, 2008). AP has also been operationalized as based on previous experience, subjective or objective knowledge (MacInnis, Moorman, & Jaworski, 1991). It has been measured as an assessment of message clarity, with respondents asked to evaluate how difficult the information provided was to understand, using a five-point scale (Bright *et al.*, 2006). It has also been measured on a six-point scale using the terms understandable and clear (Park *et al.*, 2007). This line of questioning was rejected as addressing qualitative features about the message that are more appropriate to assessing argument quality (AQ).

Street *et al*. (2001, p. 263) argue that as well as looking at the cognitive capacity of the subject, AP could also look at the "relative conduciveness of the situation for the expenditure of cognitive effort directed at the attitude object". Although they did not test message modality, Petty and Cacioppo (1986a, p.77) acknowledge its potential to be an important factor: "In addition to message factors that are capable of affecting the ability to process such as complexity, the modality of the message presentation may also be important".

This idea has since been examined by Pratkanis and Greenwald (1993, p. 330), who argue that the "competitive message-dense environment" in which messages are typically delivered can affect elaboration. They investigated communication effects in a "cluttered communication environment" and found a better outcome for messages which had what they called greater message "utility". Message utility has also been used in an effectiveness study of different channels (Burgoon *et al.*, 2002) and was operationalized as an index measuring the degree to which participants found the channel helped them accomplish a task using key terms helpful, efficient, reliable, useful (Moon & Nass, 1996). Moon and Nass's four item utility index reported a high reliability (Cronbach alpha = .80), and their six item emotional satisfaction index (for satisfaction with the mode of communication) was also reliable (.86). These scales were chosen for the study in this thesis for their high reliability indices and two further reasons. Firstly, it is argued that what is being assessed in this study is the communication rather than the capacity of the audience, and thus a situational rather than cognitive interpretation of AP is appropriate. Secondly, the channel literature discussed in Chapter Three emphasized the key difference in modes which offer face-to-face engagement, compared with those that rely on non-interpersonal methods such as the written word (Bator & Cialdini, 2000; Burgoon *et al.*, 2002; Pfau, 1990). Using questions which assess the utility of the communication may identify the nature of any differences in performance between communication activities.

5.2.1.3 Peripheral cues, focussing on source credibility (SC)

Peripheral cues may affect attitude because of their ability to trigger other associations in the minds of the recipient (Wu & Shaffer, 1987). Attitudes may then be formed or changed without active thinking about the issue by using cues or cognitive "short cuts" (Bitner & Obermiller, 1985, p. 420). Researchers have described how the format of the message itself can have impact as well as its content. Some respondents for instance, may not engage with the argument, but the sheer number of arguments they see or hear could act as a persuasive peripheral cue (Gregory, 2005; Park *et al.*, 2007). It can be seen that a broad range of situation-relevant factors, such as pleasant music or scenes as part of an advertisement, source likeability (as opposed to credibility), could all affect attitudes and behaviours if respondents are unable, for instance because of distraction, to process the central argument.

A frequently assessed peripheral cue is the source of the message. The perceived expertise and trustworthiness of the source, for instance, might trigger an assessment of the message without necessarily any need to think deeply about the arguments in it. In this way attitude

and behaviour might be changed but not via engagement with the issue. Wood and Kallgren (1988) theorized that source expertise might affect some people more than others; where people had high recall, source expertise would not have impact because participants would rely on the information they had absorbed. Contrary to expectations, those with high recall were influenced by source expertise.

Source is the appropriate peripheral cue to assess in this research. In 2006 the Local Government Association, which represents local government in England and Wales, launched The Reputation Project after research found the publics' impressions of local government were a concern (MORI, 2006). The Edelman Trust Barometer, which assesses questions of trust in a range of organisations each year found in its 2010 survey that 45% of people in the UK would put trust in information from an "NGO representative" and only 35% in information from a "Government official" (Edelman, 2010, p. 5). As set out in Chapter One, councils have considerable responsibility for delivering carbon reductions in local communities. While local government enjoys higher levels of public trust than national government or energy retailers over issuing advice such as energy saving (Local Government Association, 2007), it is a relevant concern for communication campaign organisers to address whether the organisation itself is a barrier or enhancement when attempting to change environmentally significant behaviours.

Jones *et al.* (2004) defined characteristics of the source as the extent to which they were seen as trustworthy and competent by the receiver. Others have also focussed on concepts of expertise and trustworthiness (Hu & Sundar, 2010). Wu and Shaffer (1987) assessed the impact of source using the terms inept/expert, knowledgeable/not knowledgeable, credible/not credible, reliable/unreliable, trustworthy/untrustworthy. The concept of expertise was tested with the phrases: expert, competent, knowledgeable, well read and intelligent (Wood & Kallgren, 1988). In a study promoting physical exercise, source was rated on seven-point scales anchored at 'not at all' and 'extremely' using the terms knowledge, competence, intelligence, credibility, likeability and expertise (Jones *et al.*, 2004). Likeability was omitted and the remaining items had a reported Cronbach alpha of .84.

As a result of a review of the literature on source, the focus in this research will be on assessing SC using terms drawn from previous research: credible, trustworthy, suited to an activity like this, expert, competent, knowledgeable. Consideration was given to possible conflict between the organisation represented and the person standing in front of participants delivering the message. Further source questions appropriate to the

'authority' of the person (e.g. Burgoon *et al.*, 2002) were considered. Taking into account practical and analytical considerations, it was decided to clarify the question about source to ensure it was clearly about the organisation and not the individual, and not to pursue a separate set of source questions about the different spokespeople.

5.2.1.4 Argument quality (AQ)

The creators of the ELM argue that the construct of AQ has wide application. Rather than describe the specific qualities an argument would need, they broadly define it as "information contained in a communication that are relevant to a person's subjective determination" (Petty & Cacioppo, 1986b, p. 133). They do state that in each instance this information should be judged by the criteria of believability, comprehensibility, complexity and familiarity. In a review Johnson, Maio and Smith-McLallen (2005) found AQ the variable to be most likely to be included in an ELM study as it is easy to manipulate in experimental research designs. Their review suggests strong arguments are more persuasive than weak ones but that effects vary according to levels of other variables, such as levels of motivation (or involvement), message length and the nature of the argument contained in the message. They also warn that AQ cannot be determined by theory but should be pre-tested in each situation. The importance of the construct is highlighted by Fishbein and Azjen (1981, p. 359) who argue that "the general neglect of the information contained in a message ... is probably the most serious problem in communication and persuasion research."

The variable has been assessed by participants as well as by manipulation. Perceptions of persuasive communication contained in an article were measured on a nine-point scale using the terms persuasiveness, clarity, accuracy, memorability, importance, helpfulness and usefulness (Updegraff *et al.*, 2007). Participants also responded to two more questions rating the article overall; the items together provided a Cronbach alpha of .87.

In another study perceptions of a message were tested on two 15-point scale questions which asked participants to rate the fairness of the message and whether it was carefully thought out (Wood & Kallgren, 1988). No Cronbach alpha data was published. Park, Lee and Han (2007, p. 146) measured perceived quality (of information in online reviews) by asking subjects to indicate the following statements on a six-point scale anchored by strongly disagree/strongly agree:

Each review has sufficient reasons supporting the opinions; Each review is objective; Each review is understandable; Each review is credible; Each review is clear; In general, the quality of each review is high.

The information from the scale was used to manipulate the variable. Again, no Cronbach alpha data was reported.

Sparks and Areni (2008) assessed AQ as a manipulation check using a seven-point scale with the following anchors: invalid arguments/valid arguments, unpersuasive/persuasive, and unconvincing/convincing. They reported a Cronbach alpha of .94. The construct has also been measured using four nine-point semantic differential scales (harmful/beneficial, wise/foolish, good/bad, favourable/unfavourable) These were used to create an index of 'communication acceptance' (Petty & Cacioppo, 1979). Semantic differentials or adjective pairs representing opposite ends of a continuum have been used to determine whether messages are perceived as believable, unbiased, informative, interesting, fair, useful and persuasive, although Cronbach alpha data was not reported (Lundy, 2005; Sha & Lundy, 2005).

As a result of this review of the literature on AQ, key words for the study in this thesis were selected on the basis of making sense to participants and successful use in previous studies. This involves using the terms believable, clear, credible, convincing, relevant, memorable.

5.2.1.5 Message elaboration (POSTELAB)

All of the independent variables listed thus far are hypothesised to have an impact on the dependent variable – message elaboration. There are a number of ways in which elaboration can be defined, starting with the amount of effort participants exert in thinking about a message (Petty & Cacioppo, 1986b). Other factors to indicate the outcome of the persuasive communication include resulting knowledge, attitudes and behaviour change (Roser, 1990). For the purposes of campaign evaluation Devine and Hirt (1989) recommend measuring a range of behaviours relevant to the campaign as a fair test of its success.

The level of cognitive effort engaged in has been measured by several means, some of which are less feasible in an applied study. For instance, one experimental or laboratory technique asks participants to list thoughts while, for instance watching a movie or talk. Another technique is to use a weak and a strong message and ask participants to rate the difference. A further involves simply asking participants how much effort they used thinking about the message (Petty & Cacioppo, 1986b). This last method appears the most practical to pursue for the proposed study and has been widely used.

Respondents were asked how carefully they had read the information provided to them and also how likely it was that the information would change their behaviour regarding the message they had received, both on a five-point scale (Bright *et al.*, 2006). Cronbach alpha reliability was not reported. Purchase intention (asking participants to rate whether it was likely they would buy the product and whether they would recommend it to friends) has been measured on two six-point scales anchored with "extremely unlikely" and "extremely likely". These two items had a Cronbach alpha of .87 (Park *et al.*, 2007, p. 133).

Asking participants to assess a range of actions as a result of taking part in the communication activity is both appropriate and practical for the research in this study. This means, in effect, defining elaboration as behaviour. The operalization of behaviour is provided later in this chapter, as part of the literature review of the TPB.

5.2.2 Omitted variables

It has been argued that the ELM is general enough to be of use in a range of persuasive situations, but this also means that some of the variables or cues sometimes need to be discarded because they might not be relevant in some contexts (Street *et al.*, 2001). Researchers have instead selected those factors of the ELM most likely to have significant impact on the amount of cognitive effort expended. A study aimed at finding out how residents responded to fire safety information also took this approach, testing key relevant elements of the communication process – source credibility, message clarity, message elaboration, and behaviour change, but not, for instance, an individual's need for cognition (discussed below), an internal factor over which it had no control (Bright *et al.*, 2006). Park *et al.* (2007) also chose factors relevant to the given circumstances of the communication under examination. They focussed on online reviews of a product; whereas in reality it is argued that it is likely consumers would consult more than one source of information before making the purchase under scrutiny. In this study, decisions on which variables to include and which to omit were taken on the basis that what was sought was a fair test of the key elements of the ELM in a communication evaluation context.

Examples are provided by an overview of variables omitted from the research in this thesis. Need for cognition is a variable which captures how some individuals have a higher need to think about things in meaningful ways than others (Wegener & Fabrigar, 2004). It has been omitted in this thesis because it is a variable internal to the recipient and not a feature which the campaigners were able to influence. While involvement could also be argued to be a variable internal to the recipient, campaigners do need to know the extent to which their

audiences find a campaign message engaging as a means of deciding the content of such messages.

Message framing, whether a message is framed positively or negatively for instance, is another variable often tested within the ELM (e.g. Jones *et al.*, 2004). As message manipulation was not a feature of the proposed campaigns to study it was not included in this research. In summary, the flexibility of the ELM will be used to look at the main influences which appear relevant to the study, rather than attempting to exhaustively study them all.

5.2.3 Assessing central or peripheral processing

Another main feature of the ELM which is not fully developed in the research design used in this thesis is the concept of dual routes to processing – central and peripheral. It will be recalled from Figure 5.2 that central or peripheral processing refers to two ways, or routes, for communication to impact on elaboration (or behaviour). Both may predict behaviour, but central processing is hypothesised to be more likely to achieve thoughtful lasting change. This complex aspect of the theory has led to criticism. Lien (2001) and also Eagly and Chaiken (2005) argue that the flexibility of many variables serving multiple roles makes the theory as a whole difficult to confirm or disconfirm. Indeed in the more than twenty years since the model was formulated Choi and Salmon (2003) argue that this concept has been one of the most controversial. They reason that confusion arose because initial specification referred to 'routes' which were inferred to be distinct. Later writing on the ELM clarified the continuum nature of processing with multiple routes (Petty & Wegener, 1999). Some variables might prompt effortful information processing for some, but not others. Other variables initially thought to be peripheral might trigger central processing for some people (Petty & Wegener, 1998). As such it would be extremely complex to try to empirically test multiple processing in the applied research proposed. Devine and Hirt (1989) agree that while conceptually it is easy to distinguish between central and peripheral cues, it is difficult to explain empirically which sort of elaboration effect is causing change. They argue for interpretation of results given the context of the research in an applied study, or to manipulate variables in an experimental study. Petty and Wegener (1999) state that it is acceptable to consider the predictive power of independent variables (such as source credibility) as a measure of whether central or peripheral processing is occurring, and that is the practice adopted here.

5.3 Theory of Planned Behaviour

The belief that attitudes are preparatory to behaviour (Ajzen & Sexton, 1999) stretches back more than forty years before Ajzen and Fishbein introduced new formulations to explain the phenomena in detail. That period was also marked by a series of research reports which found only inconsistent links between attitude and behaviour (Ajzen & Fishbein, 1977; Armitage & Christian, 2003). The Theory of Reasoned Action (TRA) was formulated by Fishbein and Azjen (1975) to investigate the discrepancy. The TRA seeks not just to predict behaviour, but to understand it by identifying the determinants of behavioural intentions (Ajzen, 2005). It argues that intentions, and subsequent behaviours, are a function of attitudes towards a specific behaviour and a person's perception of social pressure to perform the behaviour (subjective norm). Unlike rather general attitudes studied in the past, the TRA defines attitude as a person's evaluation of performing a particular behaviour (Ajzen, 2005). Subjective norm is similarly specific in that it relates to a specific, not general, behaviour.

Later Ajzen (1991; 2005) added the further construct of perceived behavioural control. This accommodates situations where intention to act might be mitigated by a person feeling that they wanted to perform the behaviour but are unable to for reasons outside their control. With this addition, the theory was called the Theory of Planned Behaviour (TPB). In summary this theory describes how, if a person has a more favourable attitude, stronger subjective norm and perception of control towards a behaviour, the more likely it is they will perform the behaviour in question (Ajzen, 1991).

5.3.1 Expectancy Value Model

The formulation of the TPB is shown in Figure 5.3. Each of the three variables, attitudes (ATT), subjective norm (SN) and perceived behavioural control (PBC) are shown to be a function of belief factors. There are two components to belief factors. In the case of attitude for instance, attitude towards a behaviour is determined by both behavioural beliefs about whether performance of the behaviour is worthwhile and a person's evaluation of the outcomes of performing the behaviour (Ajzen, 2005).

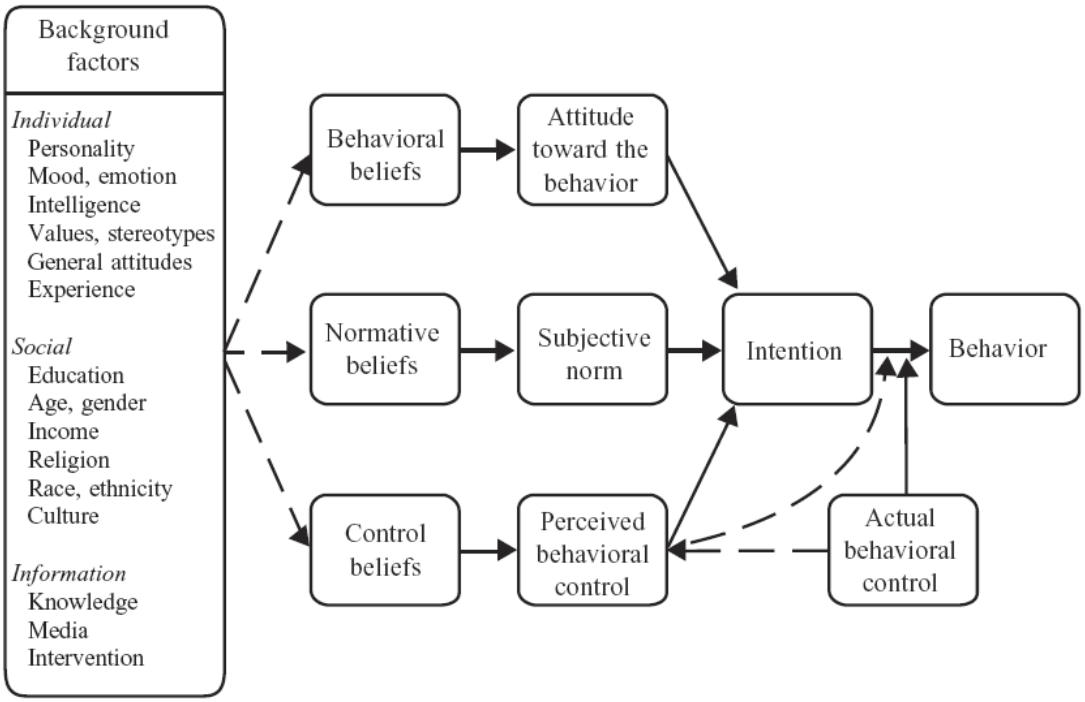

Figure 5.3. The Theory of Planned Behaviour, reproduced from Ajzen (2005)

In the case of performing an environmentally significant behaviour such as limiting the amount of water boiled in a kettle to just that required, attitude would be comprised of a belief about whether performing this behaviour would see a reduction in energy use and whether that reduction would be meaningful. Armitage and Christian (2003) report that it is common for researchers to use a global measure of attitude which comprises both of these elements of the belief-forming process. A meta-analysis of TPB studies in 2001 revealed strong correlations between belief-based and direct measures of the constructs ATT, SN and PBC (Armitage & Conner, 2001). In the light of these findings, and influenced by the constraints presented by implementing the study in an applied setting, the direct measures approach was used. However, questions were selected which attempted to capture both belief components of each variable.

5.3.2 Operationalizing the TPB

Alongside advice that questions to measure the variables of the TPB must relate to specific, not general behaviour (Ajzen, 1991), it is advised that they should also be specific about context and time (2005). For these reasons, Ajzen (2002) argues, it is often a mistake to re-use items from previous studies. As a result, specific questions were devised for this study,

but previously used measures were reviewed as a useful guide to what have proved successful question structures.

Some researchers consider that intentions are sufficiently good predictors of behaviour that they can be used as a proxy for behaviour (Armitage & Christian, 2003). It is also the case that a meta-analysis of the TPB (Conner & Armitage, 1998) found that intention only accounts for between 34% and 38% of variance in behaviour. The data collection process developed in this study (see this chapter, section 5.8) offers the capacity for both intention and behaviour to be assessed.

The next sections give further insight into each variable relevant to its operationalization, and provide examples of words, phrases and measures used to assess the TPB's independent variables in previous research, which provided a guide to terms used in this thesis.

5.3.2.1 Attitude (ATT)

Fishbein (2000) asserts that the relative importance of the three primary determinants of intention (ATT, SN and PBC), will be contextual, depending on behaviour and population. It has also been argued that the ATT component is usually stronger (Johnson *et al.*, 2005), and has maximum influence when people are not highly constrained by high levels of concern for the considerations of important others or by feeling the behaviour might be difficult. As observed earlier in this section, ATT is an overall evaluation of performing a behaviour (outcome evaluation) and the strength of belief (belief strength) that performing the behaviour in question will be worthwhile (Ajzen, 2005). Outcome evaluations might use assessment terms like *valuable* or *beneficial*, whereas belief strength evaluations might focus on the *pleasure* or *enjoyment* of the individual in performing the behaviour (Ajzen, 2002).

ATT has been measured using the expectancy-value model, measuring the two components separately. For instance in a study of hunting behaviour, participants were asked to rate features associated with the activity such as "observing and learning about wildlife behavior", "feeling tired and exhausted", and "feeling a sense of competence" (Daigle, Hrubes, & Ajzen, 2002, p. 6). Likelihood that each activity would produce these outcomes was measured on a further seven-point semantic differential scale anchored by extremely unlikely/extremely likely. Desirability of these outcomes was rated in the same way.

ATT has also been measured directly. Seven-point semantic differential scales anchored by good/bad, harmful/beneficial, and desirable/undesirable, were used for two stem questions,

"for me to reduce weight during the next six weeks" and "for me to *try* to reduce weight over the next six weeks" (Schifter & Ajzen, 1985, p. 845). The average response to all six items was used to measure ATT (Cronbach alpha = .82).

In another study participants rated ATT towards eating sweets as bad/good, foolish/wise, unpleasant/pleasant, negative/positive, unenjoyable/enjoyable, unhealthy/healthy, attractive/unattractive and a Cronbach alpha of .77 was reported (Conner *et al.*, 2007b).

The guidance from the literature aided formation of a survey for the study reported in this thesis which captured belief strengths (e.g. effectiveness) and also outcome evaluations (e.g. convenience). Further detail on this is provided in this chapter, section 5.8. (A copy of the pilot questionnaire using ATT questions is in Appendix 3 and the post-pilot questionnaire is reproduced in Appendix 5.)

5.3.2.2 Subjective norm (SN)

Subjective norms (SN) are our perceptions of social pressures to perform, or not perform, a behaviour. Specifically the pressures are those placed by people who are important to us, rather than members of the general population (Ajzen & Fishbein, 1980). As with other TPB variables SN has two components: the injunctive component, or what participants perceive that their 'important others' think, and a descriptive component, what participants think those other important others would do. Similarly, SNs can be assessed directly (Ajzen, 2005). Incorporating both components is important. In a meta-analysis of the TPB, SN was found to be the weakest predictor of intentions, with the suggestion that this was due to poor measures (Armitage & Conner, 2001) and a multi-item rather than a single item measure was recommended.

Ajzen (2002) has since suggested that the reason for SN's weak performance is that respondents assume that people important to them will approve of desirable behaviours and disapprove of undesirable behaviours. To avoid biased response, questions should capture descriptions of what those important others actually do rather than simply what they think. In a more recent meta-analysis Manning (2009) found that inclusion of descriptive norms (what others do) as well as injunctive norms (our perceptions of what important others want us to do) strengthened the variable.

Examples from previous literature were reviewed in order to select measures for the study in this thesis. Hill, Abraham and Wright (2007, p. 1053) were able to find effects for the variable using a single question on a seven-point scale anchored strongly agree/strongly

disagree: “My friends at college think I should do at least one extra session of energetic exercise for 30 minutes or more each week.”

Schifter and Ajzen (1985) averaged four items to obtain a measure of SN, two about losing weight and two about the effort of losing weight. For each, respondents indicated on a seven-point scale whether people important to them thought they should try to reduce weight over the next six weeks (scale anchored should/should not) and whether these same people would be supportive of such action (support/oppose). The Cronbach alpha for this measure was .88.

As a result one of the questions in the survey reported in this thesis asks to what extent ‘important others’ take action on the behaviour in question themselves, alongside questions assessing the injunctive element.

5.3.2.3 Perceived behavioural control (PBC)

PBC is a function of perceptions about factors which might help or hinder the performance of a task. It comprises control beliefs associated with a person’s own personal resources (skills and abilities) and their perceptions of external obstacles to their performance of a behaviour (Ajzen, 2005). It is also a reflection of *perceived* rather than actual control, or the extent to which people *believe* performance of a behaviour is easy or difficult (Ajzen, 1991). These beliefs may be based on a number of factors, such as past experience, second-hand information or observing others. Ajzen (2005) warns that PBC may not perform accurately as a predictor of behaviour in circumstances where a person’s perceptions are substantially different from actual level of difficulty, such as when the individual has little information about the behaviour or it is new or unfamiliar.

Ajzen (1991) also acknowledges that the internal component of the variable is closely compatible the Bandura (1982) concept of self-efficacy. Armitage and Conner (2001) report that some researchers have used Bandura’s concept in place of PBC, but they distinguish a difference between the two, in that self-efficacy is a more internalised definition of PBC associated with an individual’s confidence in their own ability. The appropriate approach for this study is to use the original TPB definition associated with more external perceptions about performing the behaviour in terms of its ease or difficulty. This is more relevant to a study of those factors within the scope of a communication campaign[14]. Such a campaign

[14] For a detailed discussion of the advantages of using the TPB rather than Bandura’s Social Cognitive Theory when intentions are not yet established, see Hardeman *et al.* (2002).

would, for instance, provide practical information about how to adopt new behaviours and be aimed at factors external to the individual such as cost, ease and where to access.

Armitage and Conner (2001) note differences in the operation of the PBC compared with SN and ATT. In situations where SN and ATT are strong, the influence of PBC may be less predictive of intention. In situations where capability is strong, such as with behaviours perceived as easy to perform, the PBC variable will have no influence on the relationship between intention and behaviour. In the opposite situation, such as with a behaviour perceived as difficult to perform, PBC may moderate the relationship between intention and behaviour.

PBC is also theorised to affect behaviour directly as well as indirectly via intention (Ajzen, 1991). For instance, if two people had equally strong intentions to recycle more types of materials, the person with greater confidence that they could successfully achieve the goal would be more likely to persevere. This moderation of the effect of intention by PBC however, was not supported in a review of studies (Ajzen, 1991) and is an aspect of the TPB not considered central to the investigation that is the subject of this thesis.

Examples from previous literature were reviewed to guide measure selection. PBC can be measured by asking participants whether they believe they are capable of performing the behaviour of interest and whether they believe such behaviour is completely under their control (Ajzen, 2005). On a scale of 1-100, respondents were asked the likelihood of them managing to lose weight and their estimate of how successful they would be (Schifter & Ajzen, 1985). Responses to the two questions were averaged to represent the variable PBC. In another study (Armitage & Conner, 1999, p. 79) researchers tried to capture external factors affecting control by asking diet respondents to respond to statements assessed on seven-point scales such as, "Whether or not I eat a low fat diet in the next month is entirely up to me," (anchored strongly disagree/strongly agree) and "How much personal control do you feel you have over eating a low-fat diet in the next month?", anchored with very little control/complete control. The Cronbach alpha was .71. Hill, Abraham and Wright (2007, p. 1053) used the questions ''I could easily do at least one extra session of energetic exercise for 30 minutes or more each week'' and ''I have everything I need to do at least one extra session of energetic exercise for 30 minutes or more each week''. The questions used a seven-point scale anchored by agree/disagree. The Cronbach alpha for the scale in the pre-intervention survey was .72 and post-intervention .76.

As a result of this literature review, questions were formed to accommodate both components of the PBC. The control beliefs or self-efficacy component was accommodated using questions with key words 'control' and 'easy'. The perceptions of external obstacles were assessed by participants being asked if they had the facilities and information to act.

5.3.2.4 Intention to elaborate (INTELAB)

The intention variable captures the level of motivation to perform a behaviour and how hard a person is willing to try (Ajzen, 1991). As was discussed earlier, intention should correspond to the behaviour under discussion (Ajzen & Fishbein, 1980) in order to achieve maximum predictive power (Ajzen, 1991). Questions about intention can be phrased as desire to perform, or self-prediction about performing, with the latter being found to be stronger predictors of behaviour (Armitage & Conner, 2001).

Intention to drive was measured using the response options increase/stay the same/reduce for a single question, "Do you plan to change the amount that you use the car to travel to De Montfort University (DMU) during the next 12 months?" (Wall, Devine-Wright, & Mill, 2007, p. 750). Two seven-point scale items were used to assess whether participants "intended" to engage in hunting and whether they were "planning" to engage in the behaviour (Daigle *et al.*, 2002, p. 5), with both scales anchored by extremely unlikely/extremely likely.

Intention to exercise (Hill *et al.*, 2007, p. 1053) was measured by two items, "I am going to do at least one extra session of energetic exercise for 30 minutes or more each week" and "I will definitely do at least one extra session of energetic exercise for 30 minutes or more each week", with similarly phrased questions posed post- intervention. This technique of using similar phrasing to capture both intention and behaviour questions was the approach adopted in the study reported in this thesis. Questions investigating intentions and behaviour were similarly phrased to achieve maximum compatibility between the two measures. Such compatibility contributes to strong intention-behaviour correlations, with various meta-analyses reporting correlations of between .44 and .82 (Ajzen, 2005; 2008).

Aiming for maximum compatibility with behaviour questions also required recalling Devine and Hirt's (1989) advice that when evaluating communication, a range of a range of relevant behaviours should be assessed. As a result participants were asked not just about intended behaviour changes but about intended actions preparatory to behaviour, such as whether they might seek further information (complete wording can be seen in the pilot questionnaire in Appendix 2 and in the post-pilot questionnaire in Appendix 4).

As discussed below, behaviour is a shared dependent variable for both the ELM and TPB, and is defined as message elaboration as measured by behaviours resulting from the communication activity. Intention, as a precursor to this, is defined in this study as intention to elaborate.

5.3.2.5 Post-elaboration behaviour (POSTELAB)

It should be recalled here that behaviour is to be measured as the outcome variable for both the ELM and the TPB. Earlier in this chapter it was explained that an appropriate ELM outcome measure would be to assess actions of participants as a result of taking part in the communication activity, or message elaboration. Armitage and Conner (2001) note that behaviour is often a self-report measure, which, as with other social psychological theories, can create problems of validity in that people may report behaviour inaccurately. They give an example of people thinking they have eaten a 'low fat' diet when, technically, this is not correct. Sutton (1998) recommends clarifying for participants the assessment measure for behaviour. Self-reports can also be strengthened by the use of multi-item scales (Ajzen, 2005). This clarity about behaviour was achieved, to an extent, in the study reported in this thesis in that the questions asked at intention were re-used with the tense changed to check behaviour after a period of between four to five weeks.

One final consideration made was to incorporate the potential for differential levels of behaviour when framing questions. Several factors may affect how quickly people adopt new behaviours, including time (Faiers, Cook, & Neame, 2007). Arriving home from a persuasive communication activity with new resolve to install energy efficient light bulbs may see immediate action. In contrast, arriving home with resolve to investigate adding solar panels to your home may take more time to enact as costs and technical difficulties are researched. Consequently questions captured a range of possible preparative actions to indicate behaviour.

A later section of this chapter (5.8) sets out the detail of the measures used to assess the variables reviewed in this section.

5.4 Hypotheses

The hypotheses presented below are based on the literature reviews conducted earlier in this chapter on both of the theories being analysed and also on the expected increased efficacy of bottom-up communication approaches, discussed in Chapters Two and Three. They are

expressed as alternative hypotheses (Creswell, 2003), in that they predict the expected outcomes.

H1. Participants who are involved in activities with bottom-up communication characteristics will have higher scores on the dependent variable, behaviour (POSTELAB) than those involved in top-down activities.

H2. Differences between the activities are explained by differing scores on either the ELM or TPB independent variables, or both.

5.5 Three component design

This is theory-driven fixed design research (Robson, 2002). It is fixed in the sense that pre-determined questions are set ahead of data collection. It is theory-driven in that two theories which form the model to be tested are well expressed in previously published research. It is also intended to examine quantitative differences between groups by asking questions at two time points and comparing responses with a view to making a statement about one group performing in a measured way differently to another.

An alternative flexible design (frequently referred to as qualitative) might be characterised by having a more open-ended inquiry with a view to developing new theories (Creswell, 2003). Such an alternative design could have sought useful feedback for communicators about the relative merits of the different activities seen from the perspective of participants and organisers, or for instance, could have sought to answer what it was about the source of the message that had any observed impact.

In this research, the first design problem is to identify variables that are most likely to influence an outcome. The second is to assess the utility of one intervention over another. For these types of inquiry a quantitative approach is usually more appropriate (Creswell, 2003). The third component of the design is translational.

5.5.1 Correlational research design

The TPB is assumed to be a causal model (Ajzen, 2008; Conner & Armitage, 1998). The ELM is a framework to assess the effects of persuasion (Eagly & Chaiken, 1993; Petty & Cacioppo, 1986b). Both theories are based on the idea that changes to the independent variables cause changes in the dependent variable. Correlational research cannot prove this. It is possible that cause and effect is the opposite of that hypothesised, or that another variable not the subject of the research was the cause (Tabachnick & Fidell, 2007).

However, the weight of evidence as a result of repeated testing and ability to conduct meta-analytic reviews provide strong support for the causal ordering suggested by the TPB (Conner & Armitage, 1998; Hardeman *et al.*, 2002; Manning, 2009) and the ELM (Johnson & Eagly, 1989; Keller & Lehmann, 2008).

Correlational research requires data for the creation of measured variables. This is best gathered using a series of structured questions prepared in advance (Stangor, 2007). Wegener and Fabrigar (2004) advise that context should be considered when designing research. The context in the case of this research required that it contain structured questions capable of being answered in a reasonably short period of time. For some data collections the participants were approached immediately after they had participated in the communication activity. In such circumstances they had already voluntarily given up their time to participate in the communication activity and the amount of time they could be asked to devote to participating in the associated research activity needed to be time-limited. This was to avoid high numbers of refusals with the potential for response bias. The follow-up survey was largely completed by telephone, which presented limitations for the number of response options that could be communicated without the aid of a visual prompt.

With these limitations in mind, two survey questionnaires were constructed containing short questions with self-report responses. The first was measured as taking approximately 12 minutes to complete and was used at the time of the communication activity. The second took approximately eight minutes to complete and was used between four and five weeks later. The allocation of the questions to first or second questionnaire was done on a partly practical basis (to keep the questionnaire on each occasion to a reasonable size) and as much as possible according to the reasoning of each theory. As the first surveys were all conducted at the point of being asked to engage with a piece of persuasive communication about environmentally significant behaviours it was logical to ask participants to comment on communication variables at the first survey.

The timing of the second survey was guided by argument that communication effects are not at a maximum immediately after communication has been received, but require time for consideration and discussion (McGuire, 2001). There is no definitive guidance on optimum time to elapse; for example in a message dense and rapidly moving situation such as a political election intentions were measured in a week (Fishbein and Coombs, 1974, in Ajzen, 2005) but more frequently studies tend to report taking place after four to five weeks (See Daigle *et al.*, 2002; Sejwacz, Ajzen, & Fishbein, 1980; Sheeran, Abraham, & Orbell, 1999). In a guide to preparing and conducting a questionnaire to study the TPB, Ajzen

(2002) refers to returning to participants after one month. Azjen (2005, p. 103) also discusses how the greater the time interval, the greater the possibility of instability and although not specifying a time, recommends "short" intervals between assessment of intentions and observations of behaviour.

5.5.2 Group (activity) comparison design

Collecting data from a series of activities allowed the assessing of effects according to which type of communication activity was involved. This is called a quasi-experimental research design (Stangor, 2007) as it uses pre-existing groups (as defined here by which activity participants undertook) rather than being able to operate design features such as random assignment.

The group comparison design used here did not have a control group. A control group was considered but the specific nature of the questions, requiring evaluations of the activity, would not have been meaningful for participants to complete. Lack of a control group has an implication for effect sizes in that every group examined should be making some alteration in behaviour and therefore the difference between them could be quite small, leading to small effect sizes. An alternative experimental design, with deliberate weak and strong manipulations, produces larger effect sizes (Booth-Butterfield *et al.*, 2007).

The group comparison design was partly determined by the fact that this research was conducted in the field, the subject of the next section.

5.5.3 Translational design

A key objective of this research is to generate a theory-based programme evaluation framework suitable to give feedback about the effectiveness of communication activities to policymakers and practitioners as well as the social science community. As set out in Chapter Three translational research tests the usefulness of theory in addressing real world problems (Salovey & Steward, 2004).

A review of intervention studies aimed at household energy conservation found that most were field experiments and used quasi-experimental designs (Abrahamse *et al.*, 2005). While quasi-experimental designs are considered weak for researchers attempting to argue findings that a series of independent variables have influenced a dependent variable, a systematic review of mass communication campaign evaluations by Noar in 2009 found that 70% had used quasi-experimental designs, with either pre- and post-test (38%) or post-test only (32%). Such designs are used more frequently because they are tracking

effectiveness ‘in the field’, in situations where there are no natural controls, random assignment is not possible, and where the researcher may not have access to participants in advance of the communication activity (Noar, 2009).

The situation in this research was similar, in that the targets of the activities were chosen by the organisers, or were self-selecting, presenting a situation where the researcher had no ability to assign participants to conditions (Oskamp & Schultz, 2005).

Although there were two surveys at different time points they both took place after the communication activity, as some of the activities presented no opportunity for the researcher to survey ahead of the communication activity. This effectively means this is a post-test only design, with no pre-test which would have provided data to control for pre-existing attitudes.

5.6 Validity

The research design used presents potential threats to validity. Creswell (2003) identifies four main types – internal, external, construct and statistical conclusion validity. Issues with internal and external validity are largely addressed in this section. Statistical conclusion validity covers any error in statistical analysis that increases the risk of a Type I or Type II error. This issue is addressed throughout this chapter and the results chapters through description of techniques and tests used at each stage of data analysis. Construct validity concerns whether measures test the concepts or constructs it is claimed they do, and is addressed in the factor analysis section and also through piloting of the surveys, both reported later in this chapter.

A major threat to internal validity concerns the extent to which the research permits claims that independent variables or treatments were the cause and dependent variables the effects (Judd, 1996). Trochim and Land (1982) suggest that social science researchers attempting to make such a claim must attempt to meet three conditions; firstly, there needs to be an association, secondly the effect must occur after the ‘treatment’ in time, and finally there should be no other plausible explanations for the effect, although it is acknowledged this final requirement is the hardest for quasi-experimental designs to achieve. The first of these conditions is addressed in the results chapter, Chapter Six. Preacher and Hayes (2008a) argue that the second condition is met by collecting data at different time points.

The third provision is partly addressed by monitoring whether other campaigns or initiatives were operating in the area at the same time. This counters the ‘history’ threat to internal

validity, namely that things may change in the participants' environments other than those which are the subject of inquiry (Robson, 2002). The researcher monitored media coverage and consulted campaign organisers, and also conducted a retrospective search of news coverage both nationally and locally for relevant other influences using Lexis Library database. Table 5.2 summarises examples of related events and activities communicating information relevant to environmentally significant behaviours (ESBs) during the period of the data collection.

Table 5.2. Other potential influences on behaviour during data collection

Initiative	How linked to ESBs/communication	Time period
Warwick District Council new recycling collection service	Received negative publicity due to initial collection problems (Simpson, 2008).	April 2008
The Carbon Energy Reduction Target (CERT) scheme	The six largest energy suppliers were offering incentives to reduce carbon dioxide emissions from domestic buildings in Great Britain (Brignall, 2008).	Throughout data collection period
Warm Front grants	Insulation and heating improvements available to people on certain benefits (DECC/Eaga, 2009)	Throughout data collection period
The Low Carbon Buildings Programme	Householders could apply for grants towards the cost of installing certified products by a certified installer, such as solar photovoltaics and solar thermal hot water[15].	Throughout data collection period
Act on CO_2	All Government information on climate change brought under Act on CO_2 brand, launched with a personal carbon calculator in June 2007[16].	Throughout data collection period
Earth Hour	Similar to the SIO campaign in that it encourages participants to switch off lights to show support for taking action to mitigate climate change (Jha, 2009).	March 28, 2009

*Data collection period ran from June 2008 to March 2009.

The activities noted in Table 5.2 list illustrate "a media environment that is increasingly noisy, disparate and confusing on matters relating to climate change"[18] in which it is not possible to claim that other events and information were excluded from influencing participants. It should also be acknowledged that the participants in the different communication activities could have had access to information about the other activities being studied. A participant in one activity, for instance, may have seen publicity about

[15] w ww.warwickshire.gov.uk/web/corporate/pages.nsf/Links/5BF5779B892DD02A802573FB003C19DC accessed 28 May 2010

[16] actonco2.direct.gov.uk/actonco2/home/ about-us/toolkit/columnBParagraphs/0/content_files/file0/actonco2-toolkit.pdf accessed 28 May 2010

another (see Abrahamse *et al.*, 2005 for a discussion). However, the very low numbers receiving exposure to behaviour change campaigns (discussed earlier) suggests that this was unlikely to have presented an important threat to the independence of the different groups. As a precaution, when participants were completing questionnaires they were asked to refer their responses to the communication activity they had just been involved in. This was especially relevant at the second survey, when participants' attention was re-drawn to the context of the activity before the questionnaire started. As a further precaution, data were collected from as many different parts of the county as possible to reduce the threat of overlapping effects.

External validity, also known as generalisability, is the extent to which a researcher can argue that the findings obtained with a particular sample would be the same if repeated with other participants and in other settings (Robson, 2002). A study may claim to be generalisable to the rest of the population identified for the study (in this case of Warwickshire) or more widely. An example of such a threat could include a situation where participants who refuse to complete the survey are markedly different from those who agree, or a particular setting or timing might explain a particular set of results. Fewer provisions are available to counter threats to external validity when tracking effectiveness in the field.

5.7 Sample size

Statistical validity, or the power of statistical tests to identify differences between groups, is affected by the sample size (Stangor, 2007), with small samples increasing the likelihood of Type II error (failing to find an effect where one exists). Cohen's (1977) table on statistical power was consulted (as reproduced in Stangor, 2007), indicating a target group size of 35 would be appropriate for a six group study (see also Pallant, 2005). To confirm this a power analysis was conducted using the G*Power 3 power analysis programme (Faul *et al.*, 2007). Its effect size calculator confirmed that for a six group study capable of detecting medium size effects a minimum sample size of 90 was required, or 15 participants per group (this was with an alpha level set of .05 to minimise the possibility of Type I error (identifying a difference as statistically significant when it does not exist).

A larger target was set to accommodate other statistical concerns. Kenny argues (2009) that a sample size of 200 or more is needed to detect moderator (interaction) effects if using continuous variables. This is because effect sizes are typically small and need larger samples (Frazier, Tix, & Barron, 2004; Kenny, 2009). Also, low power is a particular

problem for quasi-experimental studies, as there is less scope to detect interaction when variables are not manipulated (see also Booth-Butterfield *et al.*, 2007; Frazier *et al.*, 2004). Motulsky (2010) also advises aiming for larger samples as these are more robust when intending parametric analysis.

Unequal group sizes and unequal error variance across groups can also create power issues (Frazier *et al.*, 2004). Group sizes ranged from 30 to 36 (see detail in Table 4.2). Some group sizes were smaller than the target of 35 as a result of participants being unable to be contacted for the follow-up survey. This is further discussed in the procedure section.

5.8 Measures

Two questionnaires were used. Data for the first were gathered immediately after participants had taken part in the communication activity. This survey contained all of the questions gathering data for the ELM independent variables and also the questions for the TPB independent variable, intention (INTELAB). The second survey took place after a gap of four to five weeks, and asked questions capturing data for the remaining TPB independent variables and also the shared ELM and TPB dependent variable, behaviour. This section details the make-up of these questions and how the questionnaires were administered.

Guidance offered by Wegener and Fabrigar (2004) was followed in designing the questions. These state that while data should be able to indicate someone's position on a topic relative to others, scales exceeding five to seven points may produce no additional information and result in increased error in respondents' ratings. Given the opportunistic nature of data collection for some of the activities, and largely telephone follow-up, scales of no more than five points were created.

Wegener and Fabrigar (2004) also call for researchers to use judgement when tailoring previously used scales, and only select relevant subsets. The literature review in Chapter Four set out how ELM variables in particular have been have been interpreted and measured in a variety of ways. The focus here was on selecting those which seemed appropriate and previously successful. Researchers are also advised not to confuse respondents by intermingling questions gathering data for different variables (Wegener & Fabrigar, 2004). The above guidance was used to select questions from those discussed in the theoretical literature review in Chapter Four suitable to adapt for this research.

Table 5.3. First survey questions

Variable Name	Question type	Stem for question	Evaluation/action	Number of items
Argument quality (AQ)	Likert, anchored strongly disagree/ strongly agree	Do you find the *message* of the (name of activity inserted here)...	believable; clear; credible; convincing; relevant; memorable.	5
Source credibility (SC)	Likert, anchored strongly disagree/ strongly agree	Do you find (activity host inserted here) an *organisation* that is...	credible; trustworthy; suited to an activity like this; expert; competent; knowledgeable.	6
Involvement (INV)	Semantic differential	Please rate the adjectives below for how well they represent your feeling about the issue behind the (name of activity inserted here)...	important; boring*; relevant; exciting; means nothing*; appealing; fascinating; worthless*; involving; needed.	10
Ability to process (AP)	Semantic differential	Now I want to talk about the *method* of communicating and ask you to rate (type of activity inserted here) as a means of communication...	helpful; efficient; reliable; useful; enjoyable; engaging; boring*; challenging; interesting and involving.	10
Intention (INTELAB)	Likert, anchored very likely/ very unlikely	As a result of this (insert activity description) how likely is it that you will	...think further about the issues raised? ...change your views ...change any activities in your personal or work life. ...speak positively of what has been talked about to a friend or colleague? ...become more interested in this issue when you see or hear it discussed by others ...seek out further information on this topic	5

*these questions were reverse-coded

Table 5.4. Second survey questions

Variable Name	Question type	Stem for question	Evaluation/action	Number of items
Behaviour (POSTELAB)	Four-point anchored a great deal/not at all (no neutral position offered)	As a result of this initiative, to what extent have you	...thought further about the issues raised? ...changed any activities in your personal or work life? ...spoken positively of what was talked about to a friend or colleague? ...become more interested in this issue when you have seen or heard it discussed by others ...sought out further information on this topic	5
Subjective norm (SN)	Four-point anchored a great deal/not at all (no neutral position offered)	I want you to think about people who are important to you – you can pick neighbours, friends, work colleagues as appropriate to you. To what extent would these people	...think that (insert topic) was important? ...disapprove of you discussing the topic with them?* ...be interested in this topic themselves? ...be taking action with this topic? ...expect you to take action on this topic?	5
Perceived behavioural control (PBC)	Likert, anchored strongly disagree/ strongly agree	I am fully able to control whether I include (topic) into my life (ie do you rely on others?) It would be easy to include (topic) into my life I have the right facilities to include (topic) into my life I have enough information to include (topic) into my life I would like to do this activity but I don't know if I can		5
Attitude (ATT)	Likert, anchored strongly disagree/ strongly agree	My taking action (on this topic) is convenient to me My taking action on this topic would be/is right for me The advantages of taking action outweigh the disadvantages for me. My taking action on this topic is NOT effective* My taking action on this topic is NOT worth the effort.*		5

*these questions were reverse-coded. Copies of the first and second questionnaires, pilot and post-pilot, are found in appendices 2-5.

Also observed was Ajzen's specific recommendation for the TPB (2002) that questionnaires be piloted with a relatively large set of scales, and reduced to a smaller subset that exhibit high internal consistency. The questions shown in Table 5.3 and Table 5.4 were used in the pilot surveys. Some questions were later removed after assessing internal consistency, discussed later in this chapter.

Self-report answers could be influenced by respondents anticipating scrutiny of their views by anyone reviewing the questionnaire. Johnson and Eagly (1989) argue that respondents tend to moderate their position when the intended audience's attitude is not known to prefer a polarised position. For this reason, and also to follow Ajzen's (2002) guidance about potential bias, where possible, questions were aimed at practical issues of what participants 'do' rather than what they 'think'.

5.8.1 First survey

The questionnaire used for the first survey contained assurances about confidentiality, anonymity and what the information would be used for, material which helps engender trust with participants (Creswell, 2003). It informed respondents how long the survey would take and that they were free to refuse to answer any question and to stop at any point. No incentives were offered.

Personal information was requested first, along with a request for a follow-up phone number. This was so that if participants did not want to give a phone number the survey could be terminated without gathering data. Names were included in the collection of personal data as a means of matching responses across the two questionnaires.

All of the questions on the first questionnaire offered five response options. Some, anchored strongly agree/strongly disagree, are often called Likert scales (Robson, 2002). Others were asked as semantic differentials. These explore the meaning of a concept rather than how much participants agree or disagree with it (Robson, 2002) and offer response options on which an issue can be evaluated, such as "important/unimportant" (see Table 5.3.).

5.8.2 Second survey

The questionnaire used for the second survey (see Table 5.4) contained a similar introduction with re-assurances about the use of the data and time required to complete the survey. For two question sets, capturing behaviour and subjective norm, a neutral response option was omitted (it was not sensible to offer a 'don't know' option).

5.9 The pilot

This section addresses steps taken at the pilot stage to ensure face validity, a sub-type of construct validity (Trochim, 2006), in order to ensure that the questions for each proposed variable address the same concept, especially as some were adapted from different research projects. Question responses were gathered from 34 respondents, all of whom agreed to also take part in the second survey. The respondents had all visited a stall at a peace festival to seek out environmental information.

The items from this survey were analysed using SPSS. After reversing the coding on negatively worded items and combining together all the scores from questions making up each proposed variable, these were tested for reliability using the Cronbach alpha coefficient, introduced in section 5.2.1.1. For AQ the coefficient was .806, for SC .898, for INV .891, for AP .895 and for INTELAB .820. These values indicate the reliability of all of the questions in the first survey. However, the analysis was used to delete three of the weakest performing questions from the survey. The researcher detected during collection a sense from some respondents that some questions appeared to cover the same ground, and the opportunity was taken to reduce the length of the questionnaire to avoid respondent fatigue or boredom (discussed in Braverman, 2008). The items removed were *relevant* (AQ), *needed* (INV), and *reliable* (AP).

In the second survey, a total of 30 respondents from the original data collection were able to be reached by telephone between four and five weeks after the initial collection and agreed to complete a second questionnaire. Data were reverse coded and items for each proposed variable combined as for the first survey. The Cronbach alphas were: POSTELAB .708, SN .535, PBC .667 and ATT .743. Such scores are sensitive to the number of items in the scale and with scales fewer than 10 items it is not uncommon to find lower scores (Pallant, 2005). The weaker scores were all found in proposed variables with a small number of items.

Items were identified within the sets for SN and PBC which, if deleted from the study resulted in a value of, for SN .738 and for PBC .752. The items removed from the final survey questionnaires were *spoken positively to a friend* (POSTELAB), *disapprove of discussion* (SN) and *would like to do this activity* (PBC). Copies of the post-pilot first and second survey questionnaires are found in Appendices 4 and 5.

A final change to the survey form as a result of the pilot was to alter the order of questions so that negative worded items were clustered together. This was in response to observed respondent irritation at having to stop and consider alternative responses. It was discussed

earlier in this chapter that Wegener and Fabrigar (2004) advise against intermingling of variable questions. It is argued here that the intermingling of positively and negatively worded questions had a similar negative reception from participants.

Once a range of questions that seemed appropriate to this study had been found these were adjusted to fit the specific communication situation at hand. Questions were altered slightly for each activity to accommodate different contexts, such as by adding the name of the specific communication topic (see Table 5.4).

5.10 Procedure

Much of the context for the research, such as description of the activities to be researched and the role of the interviewer have already been described in Chapter Four at the point of selecting the activities to study. Further activity by activity detail is provided in this section. Two further issues are also considered; one is associated with timing and numbers of data collections, the other is the response rate.

5.10.1 Summary description of data collection process

For practical reasons associated with when activities took place, data were gathered in the following sequential order:

Action 21 Peace Festival (A21 Peace)

Trained volunteer 'green champions' acted as advisors about sustainability at a stall at the Leamington Peace Festival held in June 2008. This was a quite centrally positioned tent people could visit to pick up leaflets off two tables or view material on exhibition boards. Green Champions were on hand to engage people in conversation about Action 21 and guide them to information of interest to the visitor. Following such a conversation, they were approached by the researcher and requested to complete survey one. A contact number was taken to enable follow up surveys to be conducted by telephone.This material was used to pilot the survey to test the questions for construct validity. With poor scoring questions removed, this material was used again in the full data analysis.

SIO volunteers (SIO Vols)

In autumn 2008 Warwickshire County Council sought volunteers from its staff to help encourage colleagues to take the Switch it Off recommended actions while at work. Briefing sessions were held for these volunteers ahead of the Switch Off week in October 2008. Initially it was hoped to collect data at these sessions but due to the number and low

attendance at each this was not practical. One session was attended and eight surveys collected. These were followed up by phone. As an alternative method to collect data, email contact details of the volunteers were obtained and the 45 remaining volunteers were contacted at the start of Switch it Off week and asked to complete the survey online using the online survey tool SurveyMonkey (http://www.surveymonkey.com). The 26 participants who responded to this request were re-surveyed online four weeks later.

SIO bag handout (SIO bags)

The council organised three bag giveaway sessions, on the Monday, Wednesday and Friday morning of Switch it Off Week (20-24 October, 2008). These were held in the market towns of Stratford on Avon, Nuneaton and Bedworth respectively. Stratford is in the south of the county and the other two towns are in the north. Collection of data was most difficult in Stratford for several reasons. More shoppers appeared to refuse bags and the invitation to discuss energy than in the other two towns. This is a relatively affluent area where the incentive may not have been sufficient. It was also observed to be a cold day and threatening rain and many people may simply have wanted to get inside the nearby stores. There were fewer issues in Nuneaton but again people stopped appeared to be focussed on their shopping. Bedworth was the best site for talking to people, but there were also more staff on hand to talk, therefore the event was over within two hours when supplies of bags ran out.

SIO Media Readers (SIO Media)

As discussed in Chapter Five, a lot of effort went into gaining media coverage of the aims of the campaign. However, unlike the majority of SIO activities, the council had no direct contact with the recipients of this activity. A convenience sample was gathered at a single sex sixth form college in Rugby. The town was chosen because it was the largest remaining town in the county estimated to have been under-represented in data collection and also least likely that residents would have been exposed to other communication activities. It was also selected because the school was willing and able to take part during Switch it Off week. The researcher collected data from two classes of 16-17 year old girls. Each participant was given an article which had appeared in the Coventry Evening Telegraph earlier that week, setting out the story of Switch it Off (see Appendix 6). It was chosen in consultation with council officers as most accurately representative of the campaign message. It was estimated this would take 20 minutes to read. Survey forms were handed out after the participants had had more than ten minutes of reading time, with the request

that they need not start filling in the survey until they had finished the article at their own pace. (The forms were handed out before the 20 minutes had elapsed to avoid the participants starting to talk to each other and possibly discuss the article). Four weeks later the researcher visited the school and collected follow-up surveys with the same classes.

SIO Universally Challenged Event (SIO Univ)

Universally Challenged was an event inspired by the popular TV programme University Challenge, but designed for children. Data were collected at the county final for Warwickshire, which was held in the week following the Switch it Off campaign, in October 2008. The theme of the quiz questions was environmental, with some specifically about Switch it Off activities. Six teams of children took part, with between five and seven children in each team. All were in year eight, which is for children aged 12 to 13. All participants were asked to take part in the survey during the half-way refreshment break during the competition. Follow-up surveys were sent to each school by post and the teacher at each school who had arranged their school's entry in the competition was asked to pass these to participants to complete a second survey. (The researcher offered each teacher the opportunity for the researcher to visit the school but in all cases the teachers viewed it as more convenient that they collect the surveys at a time suitable to them.)

Action 21 Renewable Energy Club (A21 REC)

The Renewable Energy Club was formed by three members of Action 21 as a means for people to share experiences and develop their skills in adding renewable energy or energy-use reduction measures to their homes. The group held meetings in public buildings at alternating venues in mid-Warwickshire. The key issue with this group was deciding at what point the 'activity' had begun. Installing renewable energy devices to a home is not something normally conceived and achieved in four weeks.

In order to keep the same time frame as the other surveys the researcher planned to select a 'start date' as the first or second meeting attended by a new member. This was changed in consultation with the members of the first 'collection' meeting attended. It was decided instead to collect data from people who themselves decided they were at the outset of their project. At the initial meeting, 15 of 26 people completed surveys and these were followed up by telephone four weeks later. Future meetings were attended to gather data from newcomers from that point on. In this way a rolling data collection ran from November 2008 through to March 2009.

The whole data collection ran from June 2008, when the first survey was handed out at Leamington Peace Festival, to March 2009, when the last second survey was collected from a member of the Renewable Energy Club.

5.10.2 Timing and temporal issues

The first questionnaire was used immediately after the communication activity and contained all of the questions for the ELM independent variables and the TPB independent variable INTELAB; the second, after a gap of four to five weeks, captured data for the TPB independent variables ATT, SN and PBC along with the dependent variable, POSTELAB. This was determined as the optimum choice to accommodate theoretical advice about time between activity and behaviour check, and also to make each survey balanced in size.

Having only two data collection points does mean that data for the TPB variable intention was not collected in the correct temporal order. Data for INTELAB was collected ahead of data for ATT, SN and PBC. Validity requirements discussed earlier in this chapter also reflect that cause precedes effect in time (Hoyle & Robinson, 2004; Trochim & Land, 1982). However, while this might create a concern if empirically testing each procedural step of the TPB, it is not of undue concern here. Rather, the TPB's variables are used to isolate difference between communication activities and no temporal issues are violated (e.g. attitude is not assessed for its prediction of intention).

5.10.3 Response rate

Loss of particular kinds of participants from the study can create bias (Shadish & Luellen, 2005), a bias which can affect external validity. If, for instance one type of person drops out of a study more frequently than another, the completed sample would not be typical of the original sample (Miller & Hollisty, 2007). It could also affect internal validity if there are different drop-out rates across the activities (ibid).

High rates of attrition were avoided by getting co-operation for the second survey at the start of the first. The questionnaires were designed to ensure the survey was of reasonable length and clear. Table 5.5 illustrates the attrition experienced in this study. The highest dropout figure for the second survey (11 participants) was due to a reliance on teaching staff to access children to complete the second survey (one school made no returns). It is therefore argued here that the differing attrition rates between activities are more likely to be a feature of collection method than systematic among participants. Overall completion

rate was more than 80%, indicative of a well-designed and conducted data collection (Polit & Beck, 2004), so no action was required.

Table 5.5. Data collected and attrition

Group	Total surveys at start	Incomplete/ dropped out survey 1	Incomplete/ dropped out survey 2	Total complete
A21 Peace	36	1	4	31
SIO vols	37	0	4	33
SIO bags	42	0	7	35
SIO media	40	0	6	34
SIO univ	41	0	11	30
A21 REC	37	0	1	36
Totals	**233**	**1**	**33**	**199**

5.11 Data analysis and reduction

This section describes the procedure used to form scales for analysis and further reliability tests. It also describes the use of factor analysis for two purposes, data reduction and also to confirm that ELM and TPB independent variables are clearly distinct.

5.11.1 Data screening

Negatively framed questions were code-reversed, data were checked for errors (Frazier *et al.*, 2004; Pallant, 2005) and cleaned according to the sequence proposed by Tabachnick and Fidell (2001). First, accuracy of data input was checked by looking for out of range values, by examining means and standard deviations for plausible values and looking for clear outliers. Second, a missing value analysis was conducted to assess potential problems caused by questions not answered by participants. No items had a missing rate of more than 1.5%. An expected maximisation (EM) test was conducted to ensure that the missing values were 'missing completely at random' (MCAR) rather than, for example, on a particular question. The Little's MCAR test obtained resulted in a chi-square = 33.725, df = 48, p = .941, indicating the data could be assumed to be MCAR (Garson, 2008). It was decided that as the amount of data missing was small and random, data could be analysed using the 'pairwise' option which omits cases which do not have data on a variable, but only for the calculation for which data are missing.

Even though regression analysis is robust to violation of normality, the third data cleaning requirement is to check the data for a normal distribution (Tabachnick & Fidell, 2007).

Histograms revealed that most of the scales appeared negatively skewed[17] and analysis of the mean scores on each item of the questionnaire also revealed a consistent negative skewness to all answers. This suggested a requirement to transform the data in order to normalise it (Hair, 1998), but this was avoided at this point as it would have prevented meaningful interpretation of hierarchical multiple regression used to investigate moderation (Carte & Russell, 2003). An alternative to checking for normality prior to analysis is to conduct the analysis and screen the residuals (the difference between the obtained and predicted values). If residuals are normally distributed this indicates normality of data (Tabachnick & Fidell, 2007). Residuals analysis is reported later section in this chapter.

To analyse whether extreme scores in the data set might have undue influence on analysis, the 5% trimmed mean of each *a priori* variable was analysed. This indicates the value of the mean with the top and bottom 5% of scores removed. The variable with the largest change was INV at .435 (difference between trimmed mean .4094 and mean -.0256) on a range of 22.24. No cases were removed from the data file at this point.

5.11.1.1 Reliability

The final stage of preliminary analysis was to re-check Cronbach alpha scores for a post-pilot assessment of the internal consistency of items. Table 5.6 shows the values for each of the *a priori* variables. As a result of removing low-scoring questions at the pilot phase, all were above the .7 threshold for acceptance (Pallant, 2005).

[17] These histograms are not reproduced here as the variables at this stage comprised all of the items pre-factor analysis. A table of histograms of the scales used in the later analysis to conduct hypothesis testing is re-produced in Figure 5.6.

Table 5.6. Cronbach alpha scores for proposed variables

Variable	No. of items	Cronbach alpha
Questionnaire 1		
Argument quality	5	.809
Source credibility	6	.907
Involvement	9	.922
Ability to process	8	.921
Intention	4	.876
Questionnaire 2		
Elaboration	4	.730
Subjective norm	4	.793
Perceived behavioural control	4	.813
Attitude (ATT)	4	.776

5.11.2 Factor analysis

Exploratory factor analysis was used to assess the validity of items proposed to group as scales to represent variables (Bryman & Cramer, 2005). There are two types; principle components analysis (PCA) for data reduction or aiding grouping together of items into a smaller number of variables (Tabachnick & Fidell, 2007), and factor analysis (PAF)[18]. The latter is more appropriate when a researcher has a specific theory about which items might group together (Costello & Osborne, 2005). PAF is frequently used (Wegener & Fabrigar, 2004) for constructing the sorts of measures sought for this research.

A third type of factor analysis is confirmatory factor analysis (CFA). CFA tests a final model against a hypothetical ideal (Bryman & Cramer, 2005) rather than the underlying structure of the items (Wegener & Fabrigar, 2004). Given that the ELM and TPB do not have a history of being assessed alongside each other, exploratory analysis is a more appropriate tool than CFA at this point.

5.11.2.1 Sample size

Comrey and Lee (1992, p. 217) suggest that while a sample size of 200 would produce "fair" results, larger samples are better. The ratio of participants to items is also a method of judging adequacy of sample size. Fabrigar *et al.* (1999) argue that accurate findings can be achieved with sample sizes of 100 if data have a 5:1 or 10:1 ratio (participants to items) and

[18] To avoid confusion this second type of factor analysis will be labelled using the acronym for one of the main types, principal axis factoring (as in Bryman & Cramer, 2005).

also at least three or four measured items for each factor. The data to be examined contained a ratio of 199:48 (199 participants, 48 items) or approximately 4:1, and had at least four measured items for each factor. Further action is reported below to improve this ratio.

5.11.2.2 Extraction Method

While maximum likelihood gives the best results with generally normally distributed data, principal axis factoring was used as it is better for non-normal, or skewed data (Costello & Osborne, 2005) such as in this data set.

5.11.2.3 Approach

PAF analysis was preferred with two oblique rotations. Costello and Osborne (2005) recommend oblique rotation when factors are likely to be correlated. Direct oblimin is the type reported here, with Promax used for comparison. PCA was also used as a comparison check against PAF to see whether the presence of multicollinearity (discussed next section) had any effect.

The PAF analysis was conducted twice. PAF with all survey items was explored first, and then the data were split into two with the items from each survey (collected at different time points) analysed separately. This was done for two reasons. The first was to strengthen the participant:item ratio. The previously discussed 4:1 ratio was improved by splitting the items into two different analyses. This produced ratios of 199:32 (approximately 6:1) and 199:16 (approximately 12:1) respectively. The second and more important reason for splitting was to address concerns about pooling in one factor analysis the results of survey samples taken over time (Tabachnick & Fidell, 2007). The question items for the *a priori* independent variable INTELAB and the *a priori* dependent variable POSTELAB are very similar, and intended to collect evidence of change over time. By assessing these variables in the same factor analysis there is a danger of differences between the two being obscured (Barki & Hartwick, 1994).

The value of the PAF analysis of all items was that it allowed side by side inspection of ELM and TPB items to assess whether these represented distinct factors. Once an inspection revealed no concerns about cross-loadings between ELM and TPB items, the survey-by-survey analysis was accepted as the most appropriate and is reported here.

The criteria set as a guide for determining the number of factors to accept was to use a scree plot for a visual inspection of the data, and eigenvalues when they perform as well as a set generated randomly (Costello & Osborne, 2005; Floyd & Widaman, 1995).

The following criteria were set as a guide for interpretation of items:

- for an item to be retained as contributing to a factor, it must have a primary loading to the factor at higher than .45 (Tabachnick & Fidell, 2001);
- items often have a load score for more than one factor indicating correlation with other factors. As Hair (1998, p. 113) notes, an item with several high cross-loadings "is a candidate for deletion". It was judged that, to be accepted as contributing to a factor, an item should not have a cross-loading score above .5;
- where decisions were marginal, the gap between primary and cross-loadings should be more than .2. There is no definitive guidance on gaps of this nature but other researchers have adopted a similar gap criterion (e.g. Finn & Kayande, 2004).

While having criteria helps ensure consistency Garson (2010) argues they should still be interpreted in the light of theory.

5.11.2.4 PAF analysis of first survey (32 items)

The first survey contained all of the items intended to produce measures for the SC, INV, AP and AQ variables of the ELM, plus items intended to provide measures for to the TPB variable INTELAB.

The correlation matrix was inspected to ensure there were several items scoring .3 and above (Pallant, 2005) but below .9 (Field, 2005). The Kaiser-Meyer-Oklin measure of sampling adequacy summarises the nature of correlations in the data and was .916. Values of .6 and above are required for a good quality factor analysis (Tabachnick & Fidell, 2007). Bartlett's Test of Sphericity provides a test of the hypothesis that the items do not correlate. This was significant ($\chi^2(496) = 4570.67$, $p < .001$) supporting the factorability of the correlation matrix.

The anti-image matrix, which represents the residuals after the data are fitted to a model, was inspected to ensure that the measure of sampling adequacy was above .5. for each item (Field, 2005). Communality refers to the *shared* variance of the items making up a factor (Marsh, 2001) and low values indicate items unrelated to others in the data set (Tabachnick & Fidell, 2007). Costello and Osborne (2005) argue that moderate communalities are typical in the social sciences and recommend a threshold of .4. Scores were above .4 for each item, with the exception of proposed item *unmemorable* (to measure AQ) which scored .369, and was retained but monitored as a potential item to discard.

The determinant was $1.33x10^{-11}$ suggesting multicollinearity, or high correlation between items. Multicollinearity is not a problem in PCA analysis but can be an issue in PAF analysis if it is extreme (Tabachnick & Fidell, 2007). The correlation matrix was inspected for scoring above .8 but none were found. Another alternative is to ignore multicollinearity (Tabachnick & Fidell, 2007) as none of the actions to manage it are entirely satisfactory (Grewal, Cote, & Baumgartner, 2004). Multicollinearity can cause instability – small changes in what is entered into the factor analysis can cause widely differing results. As a precaution PCA analysis was also conducted as a comparison with the PAF result. The PCA analysis resulted in the same numbers of factors being identified (the PCA result was also used at a later stage to compare whether the same items were identified as factors).

Number of factors

Eigenvalues measure the amount of variance accounted for by the component, and a factor should have a value greater than 1 (Bryman & Cramer, 2005). For small samples, Field (2005) recommends accepting eigenvalues higher than .7. The PAF analysis of all 32 items from the first survey revealed five factors with eigenvalues exceeding 1, explaining 67.07% of the variance. The first initial eigenvalue explained 40.70 of the variance, the second 8.31, the third 7.59 the fourth 6.1 and the fifth 4.37%.

Floyd and Widaman (1995) have criticised over-reliance on eigenvalues because of weak reliability at correctly identifying which factors to retain when compared with Monte Carlo methods. Parallel analysis (Watkins, 2000) was undertaken in order to compare the eigenvalues with those from a data set generated randomly. These are shown in Table 5.7 and indicate retaining four components. The retention criterion is that the eigenvalue is higher than the randomly generated value.

Table 5.7. Parallel analysis of eigenvalues of 32 first survey items.

Factor	Eigenvalue	Parallel analysis value	Decision
1	13.025	1.8474	Accept
2	2.658	1.7332	Accept
3	2.428	1.6405	Accept
4	1.952	1.5598	Accept
5	1.397	1.4953	Reject

Another method of assessment, visual inspection of the scree plot of eigenvalues against factors (Tabachnick & Fidell, 2007), is shown in Figure 5.4 and indicates a clear break point at the 5^{th} component, suggesting five factors.

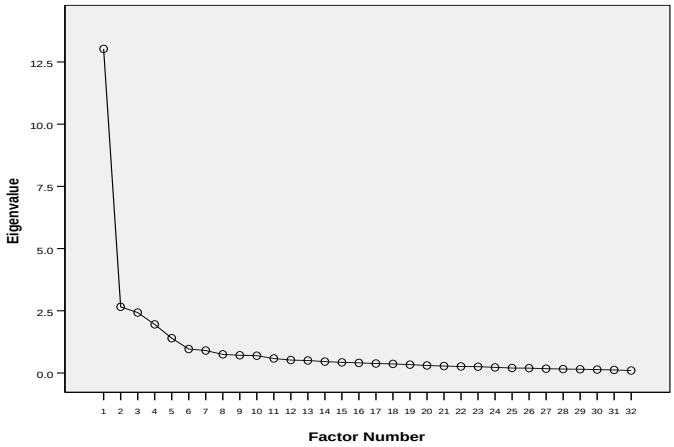

Figure 5.4. Scree plot of first survey.

Researchers are also encouraged to use *a priori* criterion for choosing how many eigenvectors/factors to retain (Hair, 1998; Tabachnick & Fidell, 2001). If in doubt, researchers are advised to err on over-selection rather than under selection of factors as this produces less error (Fabrigar *et al.*, 1999).

As the scree plot suggested five factors but the parallel analysis suggested four, direct oblimin rotation was conducted with four and five factors. With four, the matrix was not at all easy to interpret, however, with five each proposed variable could be clearly interpreted. As a result five factors were extracted.

Assessment of items

With an oblique rotation the factor matrix is available in two forms, pattern and structure. The pattern matrix is frequently reported as it is generally easier to interpret (Tabachnick & Fidell, 2007) but Bryman and Cramer (2005) recommend reporting the structure matrix as it contains important additional information about relationships between factors. In view of the multicollinearity discussed above the structure matrix is reported here. The criteria set out earlier was used to interpret items and as can be seen in Table 5.8, INV items *appealing, exciting* and *fascinating* were highlighted as strongly cross-loading, along with AP items *interesting* and *involving* items and two INTELAB items, *seek out* and *think.*

Table 5.8. Structure matrix of first survey

		Factor loadings				
A priori variable	**Item**	**1**	**2**	**3**	**4**	**5**
Ability to process (AP)	engaging	**.846**	-.429	-.426	.327	.427
	interesting	**.818**	-.478	-.439	.329	.532
	helpful	**.807**	-.367	-.378	.301	
	useful	**.802**	-.419	-.408	.325	.324
	enjoyable	**.789**	-.401	-.464	.374	.463
	involving	**.758**	-.493	-.438	.360	.527
	challenging	**.682**	-.358	-.428	.384	.478
	efficient	**.617**			.398	
Involvement (INV)	worthless	.346	**-.824**		.348	
	relevant	.401	**-.779**	-.305	.354	.435
	appealing	.360	**-.758**	-.442		.587
	important	.386	**-.755**	-.377	.349	.495
	involving	.414	**-.747**	-.322		.383
	exciting	.418	**-.739**	-.475		.668
	boring	.384	**-.737**	-.481		.581
	means nothing		**-.730**	-.361		.402
	fascinating	.445	**-.627**	-.470		.603
Source credibility (SC)	trustworthy	.406	-.377	**-.887**		.428
	competent	.386	-.409	**-.848**		.356
	expert	.373	-.340	**-.820**		.316
	credible	.321		**-.790**		
	knowledgeable	.342		**-.766**		.305
	suited	.355	-.373	**-.601**	.418	
Argument quality (AQ)	credible	.441	-.441	-.420	**.855**	
	believable	.360	-.319		**.695**	
	clear	.469			**.691**	
	unconvincing	.307		-.317	**.627**	
	unmemorable	.369	-.380	-.328	**.523**	.381
Intention (INTELAB)	seek out	.441	-.521	-.421		**.852**
	think	.422	-.512	-.381		**.789**
	more interest	.471	-.479	-.372	.391	**.782**
	change activities	.385	-.427	-.354		**.675**

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.

Primary loading shown in bold. Loadings .3 or less removed.

5.11.2.5 PAF analysis of second survey (16 items)

The second survey contained 16 items; those proposed to measure the independent variables of the TPB, and those proposed to measure the dependent variable POSTELAB.

Suitability of data for analysis was assessed in the same manner as for the first survey. The correlation matrix contained several coefficients between .3 and .9. The Kaiser-Meyer-Oklin value was .725, exceeding the recommended value of .6 and the Bartlett's Test of

Sphericity was statistically significant ($\chi^2(120) = 1246.76$, $p < .001$), supporting the factorability of the correlation matrix. The measures of sampling adequacy on the anti-image matrix were all over .5, supporting the inclusion of each item in the factor analysis. Finally, the communalities were above .4 for all but four items. These were potential behaviour item *change acts*, SN *expect you*, PBC *enough information* and ATT *convenient*. These items all scored above .3 and were monitored as candidates for deletion. The determinant was 0.001 which indicated no concerns about multicollinearity.

Number of factors

PAF analysis of these 16 items revealed four components with eigenvalues above 1 which together explain 63.47% of the variance. The first eigenvalue explained 23.87% of the variance, the second 20.24, the third 11.12, and the fourth 8.25%.

Table 5.9. Parallel analysis of eigenvalues of 16 second survey items.

Factor	Eigenvalue	Parallel analysis value	Decision
1	3.820	1.5249	Accept
2	3.238	1.4036	Accept
3	1.778	1.3195	Accept
4	1.319	1.2448	Accept
5	.836	1.1770	Reject

Parallel analysis was undertaken to compare the eigenvalues with those from a data set generated randomly. The two data sets are compared in Table 5.9 and indicate retaining four factors. The scree plot, shown in Figure 5.5, shows a change in the slope between the fourth and fifth factor, suggesting four factors. This is also in line with theory and four factors were extracted.

Assessment of items

The criteria set out earlier was again used to interpret items and as can be seen in Table 5.10, the ATT item *convenient* was found to be strongly cross-loading.

Comparison with other analyses and selection of items:

Although only the structure matrices of the PAF survey-by-survey analyses are reported here, the pattern matrix was also consulted for comparison. The PCA analysis was also consulted and gave confidence that despite multicollinearity the PAF analysis with direct

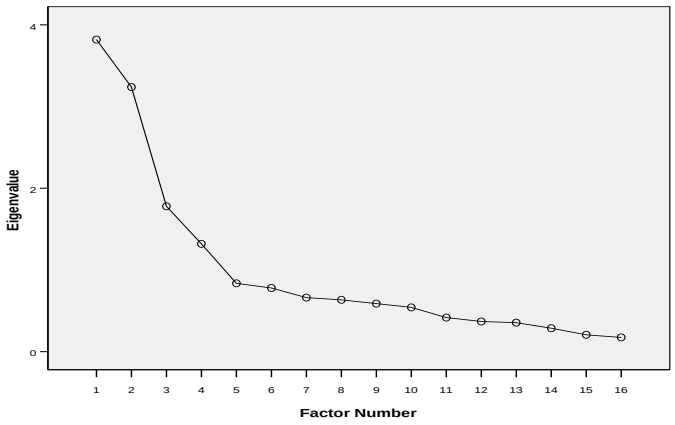

Figure 5.5. Scree plot of second survey.

Table 5.10. Structure Matrix of second survey (16 items)

		Factor loadings			
A priori variable	**Item**	**1**	**2**	**3**	**4**
Attitude (ATT)	not worth	**.886**			.306
	not effective	**.865**			
	advantages	**.574**	-.456		
	convenient	.426	**-.518**		
Perceived control (PBC)	right facilities		**-.840**		
	easy		**-.790**		
	enough info		**-.625**		
	control		**-.624**		
Subjective norm (SN)	taking action			**.820**	
	interested			**.784**	
	think			**.733**	
	expect you			**.528**	.431
Elaboration (POSTELAB)	think				**.762**
	more interest				**.652**
	seek out				**.617**
	change acts				**.566**

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
Primary loading shown in bold. Loadings .3 or less removed.

oblimin rotation offered a stable interpretation.The following items were removed from further analysis:

- from survey one; INV items *exciting*, *appealing* and *fascinating*, AP items *interesting* and *involve, and* INTELAB items *seek out* and *think*,
- from survey two; ATT item *convenient.*

The items taken forward to represent variables from the TPB and ELM are listed in Table 5.11. Cronbach alpha scores for each of the factors now re-assigned as variables are given, along with variable means and standard deviations.

Table 5.11. Items accepted to represent ELM and TPB variables.

Variable	Items accepted	No. of items	Cronbach alpha	Min possible rating score	Max possible rating score	Variable mean	Variable Std. Deviation
Ability to process (AP)	engaging helpful useful enjoyable challenging efficient	6	.886	6	30	23.1	4.834
Involvement (INV)	valuable* relevant, important involving interesting* means a lot	6	.893	6	30	24.47	5.248
Source credibility (SC)	trustworthy competent expert credible knowledgeable suited	6	.907	6	30	22.52	4.899
Argument quality (AQ)	credible believable clear convincing* memorable*	5	.795	5	25	21.1	3.054
Intention (INTELAB)	more interest change activities	2	.767	2	10	7.65	1.842
Attitude (ATT)	worth effort* effective* advantages	3	.799	5	15	12.69	2.532
Perceived Control (PBC)	right facilities easy information control	4	.812	4	20	15.94	3.929
Subjective norm (SN)	taking action interested think expect you	4	.795	4	16	11.7	2.391
Behaviour (POSTELAB)	think more interest seek out change acts	4	.734	4	16	10.1	2.805

**items originally phrased negatively but later reverse-coded.*
(Full item wording in Table 5.3 and Table 5.4)

5.11.3 Factor scores

Factor scores are composite scores needed for use as representations of each factor (or variable) in further analysis (Field, 2005). They can be created using the regression method

in SPSS (Marsh, 2001). Alternatively if, as in this instance, some of the loadings contain arbitrary negative scores, they are created by centring and totalling each item. Centring is advocated when moderation, or interaction, analysis is proposed, as it mitigates the effect of over-correlation of independent variables when interaction terms are created (Frazier *et al.*, 2004; Tabachnick & Fidell, 2007). In this instance, the selected post-factor analysis items were centred and their composite scores became the variables for analysis (see Table 5.12).

Table 5.12. Descriptives for centred composite variables

Centred scale variable	Minimum rating	Maximum rating	Std. Deviation
AP	-17.11	6.89	4.835
INV	-18.47	5.53	5.248
SC	-16.52	7.48	4.899
AQ	-9.10	3.90	3.054
INTELAB	-5.65	2.35	1.842
ATT	-9.69	2.31	2.532
PBC	-11.94	4.06	3.929
SN	-7.70	4.30	2.392
POSTELAB	-6.10	5.90	2.805

Note: Mean is now zero for all variables

Although inter-item correlations were reviewed as part of the PAF analysis, relationships between scales constructed from items should also be assessed for multicollinearity of variables to be used as regression predictors. These are presented in Table 5.13. Multicollinearity is more fully dealt with in the next section by the use of variance inflation factor diagnostics but at this stage the matrix was checked for no overly high correlations of above .8 (Field, 2005). Two-tailed significance results were reported rather than one-tailed, as at this stage, with the exception of POSTELAB, no direction to the relationships was being hypothesised (Field, 2005).

There are statistically meaningful inter-correlations between ELM independent variables of between .4 and .6, which is logical; for example if someone feels positively involved in a topic it is likely that they will also be more likely to feel positive about the messages used to convey the content of the topic and vice versa. While logical this could prevent optimum results in regression; correlated independent variables can provide overlapping prediction and smaller R values than variables with less correlation. Of interest is the low correlation between ATT and INV (r = .183) which indicates independence. This is important as the ELM and TPB have little tradition of use together and the literature review suggested these variables may not have been clearly independent.

Table 5.13. Pearson r correlations among ELM and TPB variables

		SC	INV	AP	INTELAB	POSTELAB	SN	PBC	ATT
AQ	*r*	.448	.522	.522	.436	.336	.252	.031	.285
	Sig.	.000	.000	.000	.000	.000	.000	.665	.000
	N	194	195	194	194	195	193	195	194
SC	*r*		.444	.491	.413	.384	.212	-.060	.107
	Sig.		.000	.000	.000	.000	.003	.406	.134
	N		197	196	196	197	195	197	196
INV	*r*			.493	.543	.436	.313	-.111	.183
	Sig.			.000	.000	.000	.000	.119	.010
	N			197	197	198	196	198	197
AP	*r*				.504	.399	.212	-.002	.112
	Sig.				.000	.000	.003	.977	.117
	N				196	197	195	197	196
INTELAB	*r*					.549	.344	-.141	.213
	Sig.					.000	.000	.048	.003
	N					197	195	197	196
POSTELAB	*r*						.356	-.062	.268
	Sig.						.000	.384	.000
	N						196	198	197
SN	*r*							-.065	.187
	Sig.							.367	.009
	N							196	195
PBC	*r*								.309
	Sig.								.000
	N								197

Notes: Sig. denotes two-tailed
ELM variables: INV, SC, AP, AQ. TPB variables: ATT ,SN, PBC, INTELAB.
Dependent Variable: POSTELAB.

Histograms were inspected to conduct a visual check for normal distribution and suitability for parametric testing. As can be seen in Figure 5.6, there is a fairly consistent negative skew as identified at the earlier data screening stage. This issue was investigated further using residuals analysis.

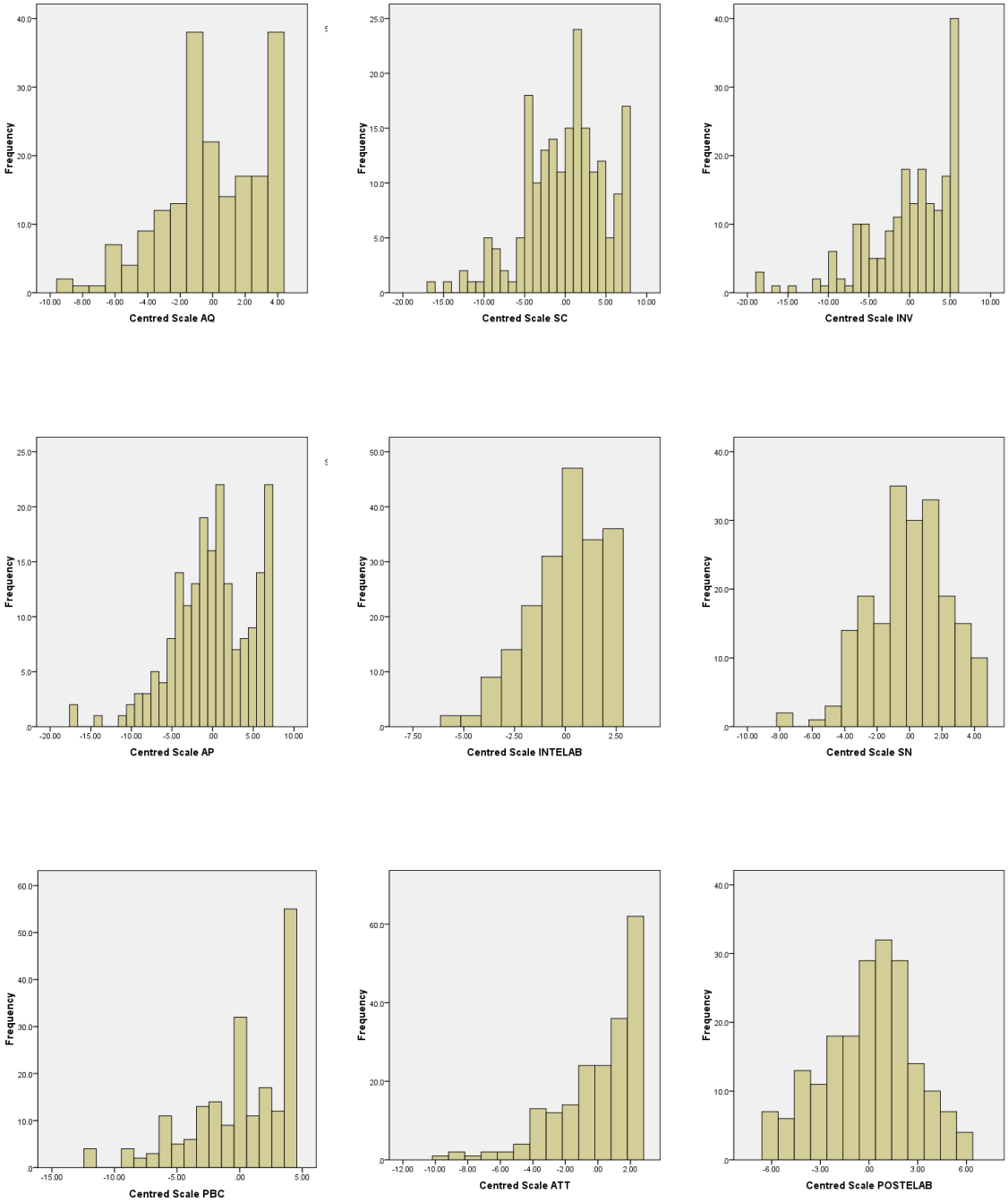

Figure 5.6. Histograms of ELM and TPB variables

5.11.4 Residuals analysis

Preliminary data screening ahead of factor analysis did not address the identified problem that the data were skewed and potentially unsuitable for parametric statistical analysis. As an alternative to transformation normality was assessed using residuals analysis. Residuals measure the difference between normally distributed data and actual data (Tabachnick & Fidell, 2007) and a normality probability plot graphically illustrates this using a straight line to represent normally distributed data. An initial regression analysis was conducted containing all independent variables emerging from factor analysis.

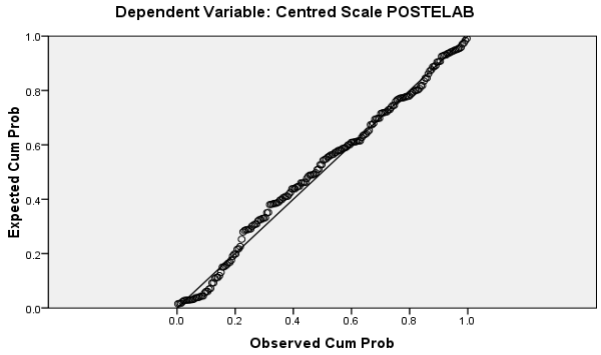

Figure 5.7. Normal probability plot for residuals analysis.

Figure 5.7 illustrates the difference between a straight line of perfectly normal distribution and the actual data when the eight independent variables (INV, SC, AP, AQ, ATT, PBC, SN and INTELAB) are regressed against the dependent variable POSTELAB. It indicates no major deviation from normality and gives a visual indication of the acceptability of proceeding with parametric analysis.

Two further statistical tests were performed to confirm the data were suitable for parametric analysis. The Kolmogorov Smirnov (D) test and Shapiro Wilks (W) tests compare the data set to a set with the same mean and standard deviation which is distributed normally (Field, 2005). If the tests are significant ($p < .05$) then distribution is non-normal. In this instance both tests were non-significant: $D(189) = .035$, $p = .2$*[19] and $W(189) = .993$, $p = .516$. The D and W tests have limitations. Field (2005) and Tabachnick and Fidell (2007) argue both are conservative and identify small skews that would not unduly affect analysis. As the

[19] The asterisk denotes in this case the K-S test being an approximation because SPSS was unable to calculate exact significance (Field, 2005).

visual inspection and the two statistical tests, despite their potential conservatism, were in agreement, it was decided that it was safe to treat the data as normally distributed.

A further assessment necessary ahead of undertaking parametric statistical analysis is to check for homoscedasticity – that the spread of variance is roughly the same at all levels of the dependent variable (Tabachnick & Fidell, 2007). A scatterplot was produced using the same regression analysis as above and is shown in Figure 5.8. It illustrates that while not perfectly evenly dispersed around zero, there is no funnel-effect, with less variance at one end of the plot than at the other (Field, 2005) which might lead to weaker findings (Tabachnick & Fidell, 2007).

As a result of the above analyses it was considered the data did not violate the assumption of normality and could be analysed further without performing transformations.

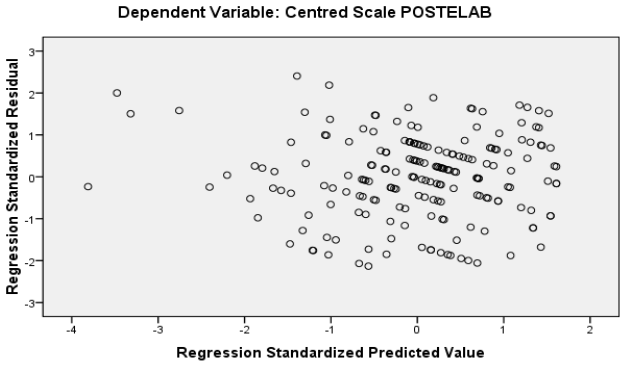

Figure 5.8. Standardized residuals plot assessing homoscedasticity.

5.12 Analytical tools

Parametric statistics offer more powerful tests than non-parametric and are the type frequently used in research of this type (e.g. Bauman *et al.*, 2006; Bright *et al.*, 2006; Conner *et al.*, 2007a; Park *et al.*, 2007). They also allow more sophisticated tests, such as interaction, or moderation, not available with non-parametric methods. Two of four requirements that should be met before their use (Field, 2005), that data are not significantly different from normally distributed and meet the assumption of homoscedasticity, were discussed above. The third is independence, or the assumption that data from respondents were gathered without one respondent influencing another. This was discussed earlier in this chapter (see sections 5.6 and 5.10.1), with participants approached individually by the

researcher or when approached in groups requested not to discuss their responses. The fourth requirement is the use of interval data, discussed here.

Likert-type scales are frequently used in the creation of variables to be assessed using parametric statistics (e.g. Bright *et al.*, 2006; Conner *et al.*, 2007a; Stead *et al.*, 2005). Such scales are technically ordinal, and do not meet the extra requirement that interval data achieves, of having a measured distance between responses. However, the assumption that the distance between "strongly agree" and "agree" and between "agree" and "disagree" is not measured and therefore not an equal interval has been challenged. Blaikie (2003) argues that it is a purist mathematical position and that pragmatists are safe to use such ordinal scales as if interval. Knapp (1990) agrees that as long as the question categories are mutually exclusive, ordered and in a clear sequence, assigning a numerical value seems reasonable. Shiu *et al.* (2009) also defend the widely accepted practice of using such scales as interval, arguing that equal distance can be assumed.

It was therefore decided that it was acceptable to progress with parametric statistical analysis using Ordinary Least Squares (OLS) multiple regression as this is an appropriate technique for assessing real world variables which are correlated with each other (Motulsky, 2010; Tabachnick & Fidell, 2007). A further multiple regression technique was used and is discussed below.

5.12.1 Moderation

Moderation is described as "an interaction, whereby the effect of one variable depends on the level of another" (Frazier *et al.*, 2004, p. 116). Jaccard and Turrisi (2003) define the nature of the relationship between independent and dependent variable as varying, depending on the value of the moderator. Hoyle and Robinson (2004, p. 213/4) define moderators as variables which can "magnify, attenuate, cancel or reverse" the association between two variables. In this case, the moderating factor to be investigated is the activity participants were engaged in.

Multiple regression was used rather than ANOVA as the latter's use of artificial cut-points to create categories involves a loss of information and reduction in power (Frazier *et al.*, 2004; Hayes & Matthes, 2009; Hoyle & Robinson, 2004). Product terms of the independent variables thought to be interacting (Jaccard & Turrisi, 2003) were made and analysed using hierarchical multiple regression (Frazier *et al.*, 2004). The product, or interaction, terms were entered into the regression equation after independent and moderator variables from which they were created (Jaccard & Turrisi, 2003). Results were interpreted by comparing

the R^2 of a model containing all main effects variables without product terms, with another in which product terms were added (Jaccard & Turrisi, 2003; Vecchio, 1980). An F test was then used to indicate significance (Field, 2005; Jaccard & Turrisi, 2003).

When reviewing studies of the type discussed in this chapter it is not uncommon to see the use of linear regression as proposed here, or structural equation modelling (SEM). SEM could have been used and has advantages in that it can assess complicated multi-models simultaneously. However, it operates best as a confirmatory tool (Gefen, Straub, & Boudreau, 2000) and the hypotheses in this research were more exploratory. It also requires large data sets. Linear regression was preferred for its ability to identify issues like multicollinearity and heteroscedasticity (ibid).

5.13 Chapter summary

Both the ELM and TPB have been identified as investigating variables associated with the categorisation of causal factors by Stern (2000) which, if examined in combination studies, might build a fuller picture of which factors predict pro-environmental behaviour. As acknowledged by Kollmuss and Agyeman, "a single diagram with all the factors that shape and influence behaviour would be so complicated that it would lose its practicality" (2002, p. 248). This chapter has sought to select and justify the use of two key theories that are potentially the most value to those intending to use communication to encourage behaviour change.

The justifications for pulling together the ELM and TPB into a combined study can be summarised as follows - this study looks into the effectiveness of communication as a tool to drive behaviour change. Balch and Sutton (1997) argue that communication can be called upon to have an impact on awareness, knowledge, attitudes, intentions and behaviour, although they acknowledge that the variables at the latter end of this list tend to be increasingly affected by other non-communication variables. The combination of ELM and TPB can account for a full chain of the impact of communication from awareness to behaviour.

There is already existing advocacy to use the TPB as both a design tool and tracking device for communication campaigns (Stead *et al.*, 2005). Similar advocacy exists for the ELM (Bator & Cialdini, 2000; Mosler & Martens, 2007; Thompson *et al.*, 2007). It is argued that due to the admitted silence of the TPB (Ajzen & Manstead, 2007; Sutton, 2002), over how much and what kind of information changes attitude, then to use both theories would deliver further insight of value to those planning communication campaigns aimed to deliver

behaviour change. The ELM examines an individual's assessment of specific external influences as well as their own internal attitudes and abilities. The TPB explores internal attitudes and abilities and also the emotional *pull* of behaving in accordance with one's important others. Both models argue that these variables can predict an 'outcome' expressed as level of elaboration (ELM) and behaviour (TPB).

Later sections detailed how these variables were operationalized and a research design was presented appropriate to test theory in the field and also to evaluate the impacts of different activities. It has explained the data collection and initial data analysis required to test the hypotheses which were set in the chapter, the results of which are reported in the next.

6 Results and discussion

> *Researchers have consistently found that once an individual is exposed to a message, it is how the individual processes the information that determines if persuasion will be enduring.* (Bator & Cialdini, 2000, p. 530)

This chapter first addresses statistical analysis undertaken to investigate the aim of this thesis, which is to contribute empirical evidence as to whether bottom-up methods offer a better way to change behaviour than traditional top-down approaches. Specifically, it delivers evidence to test the theory based evaluative framework set out as a key objective of this thesis. The first section of this chapter reports the testing of the hypotheses set out in Chapter Five. Findings are then discussed in detail, compared to previous studies. These findings are then used alongside those of earlier chapters to contribute to a review of the extent to which the objectives of this study set out in Chapter One have been met.

6.1 Statistical results

The previous chapter set out the variables and research design used to gather data. This chapter uses that data to first, identify that differences between the activities exist, and that they exist despite differing values amongst participants and the differing circumstances of data collection. Second, it investigates whether the quantitative data gathered from participants of each activity, explored in the previous chapter, can explain these differences.

6.1.1 Differences between activities

Hypotheses to explore the different activities were set out in Chapter Five. The first hypothesis to be investigated is:

> H1. Participants who are involved in activities with bottom-up communication characteristics will have higher scores on the dependent variable, behaviour (POSTELAB) than those involved in top-down activities.

A summary of the different activities investigated was provided in section 4.4. A further table is provided in Appendix 7 showing means, standard deviations, minimum and maximum scores for each activity on each variable. Estimating mean effects across groups within a data set can provide a useful start when assessing relationships between variables (Hardy, 1993). Figure 6.1 provides a visual summary of the different levels of the dependent variable (DV) POSTELAB for each of the groups.

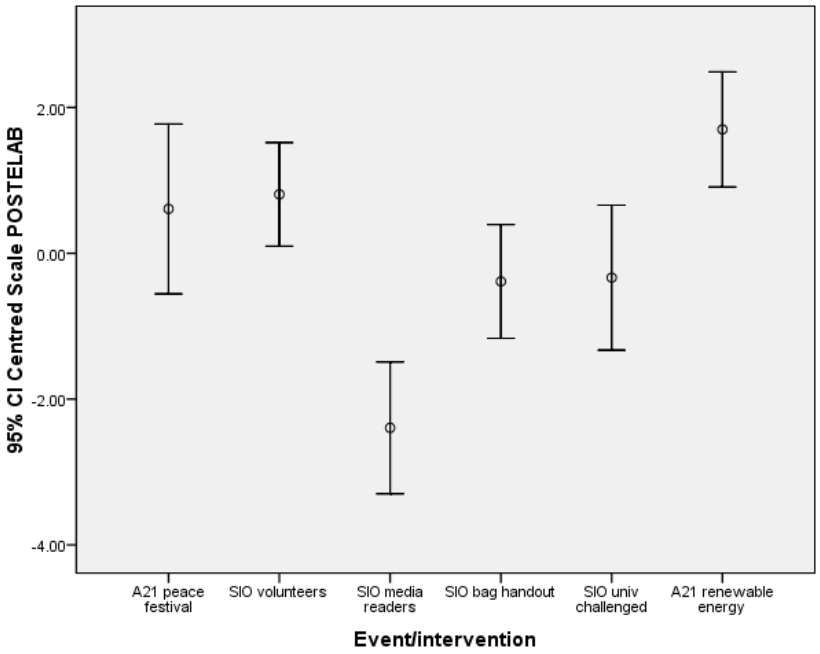

Figure 6.1. Error bar chart showing different levels of DV for the groups

The mean of each group is represented by the small circles, with the 95% confidence interval indicated by the bars which pass through the circles. It can be seen that there is a lack of overlap between some of these bars. The difference between SIO media readers and A21 renewable energy (described in this chapter as A21 REC) is quite distinct. SIO media was previously identified as the most top-down communication activity, and A21 REC as potentially having the most bottom-up characteristics. The other activities were hypothesised to fall somewhere in between those extremes. The error bar chart shows results congruent with that hypothesis. It shows clearly different mean scores on the dependent variable behaviour (POSTELAB) between some of the groups at the significant level (Field, 2005).

6.1.2 Differences explored

This section will present results from use of OLS multiple regression to confirm the indication in Figure 6.1 that there are distinct differences in DV performance between the different activities. Multiple regression was preferred to ANOVA for its flexibility in coding categorical variables such as activity-type (see Frazier *et al.*, 2004). Five dummy

variables were created, with A21 REC retained as the reference group (Hardy, 1993). As described in Chapter Five (section 5.11.3) centred data was used. Unstandardized coefficients are reported in preference to standardized (Jaccard & Turrisi, 2003; Preacher & Hayes, 2008b).

Unlike in standard multiple regression, where the beta values provide the contribution of each IV in explaining the DV (Field, 2005; Jaccard & Turrisi, 2003), the coefficient when using dummy coded variables represents the individual group differences for each group, relative to the reference group (Jaccard & Turrisi, 2003). Thus in Table 6.1 the coefficients indicate the differences in DV scores for the various activities compared with the reference activity, A21 REC; all of the activities report less behaviour change (as measured by POSTELAB) than the reference activity. This reduction is different at the significant level for the three activities at the foot of the table.

Table 6.1. Multiple Regression table showing group performances

	Unstandardized Coefficients		
	B	**Std. Error**	**Sig.**
(Constant)	1.699	.425	.000
A21 Peace	-1.090	.620	.080
SIO Vols	-.891	.610	.146
SIO Media	-4.094	.605	**.000**
SIO bags	-2.086	.601	**.001**
SIO univ	-2.033	.625	**.001**
F (5,192) 10.697, p < .001, Adj. R^2 .198			
Note: Constant = A21 REC			

The first step of investigating the hypothesis is supported, in that the A21 REC activity, considered to demonstrate the most 'bottom-up' characteristics, reports the most elaboration (B = 1.699), and the SIO media activity, with the most 'top-down' characteristics, reports the least (B = -4.094). (Note, at this stage of model building this is a simple regression with no covariates added).

The next step was to investigate the difference in performance of the activities when other variables are taken into account. Given the quasi-experimental nature of the data collected, differences between the activities could be the result of a further variable other than the activity type. For example, when asked about source credibility, some participants were reviewing different sources (the A21 participants were reviewing Action 21 as a source, the SIO participants were reviewing Warwickshire County Council).

The convenience sample nature of the data collection also makes it feasible for different types of people to be represented in the activities. It is argued that INV captures how engaged people feel with the intervention topic and that controlling for scores on this variable will go some way to cancelling out the effects of this difference. Also, intentions may differ. It is not unreasonable that people came forward to the A21 REC activity because they had prior intentions to take action, whereas participants in, for instance, the SIO groups were approached, rather than self-selecting. In order to investigate these differences, hierarchical multiple regression was used to analyse the differences between the activities, controlling for the theoretical variables for which data were collected.

In order to ensure the theoretical variables were all valid predictors of behaviour, initial assessments were conducted, using a separate regression analysis for each theory. The ELM variable argument quality (AQ) did not predict behaviour at the significant level in an assessment of the ELM, and the TPB variable perceived behavioural control (PBC) similarly did not predict behaviour in an assessment of the TPB. As these variables did not behave in accordance with theory, they were removed from further analysis (Field, 2005).

The analysis did include gender in the first block. This was done to further remove a potential confounding variable, due to one of the groups, SIO media, being completely female. Table 6.2 shows that when levels of INV and other covariates are controlled for, plus the possible confounding variable of gender, activity type still accounts for a difference at the significant level (shown in Block 2) for SIO media compared with A21 REC (constant). These are the two groups representing the extreme ends of the bottom-up/top-down continuum.

Table 6.2. Hierarchical Multiple Regression illustrating group differences controlling for possible confounding factors

	Unstandardized Coefficients		
	B	**Std. Error**	***Sig.***
Block 1			
(Constant)	1.610	.549	.004
SC	.050	.040	.211
INV	.050	.039	.199
AP	.040	.043	.356
INTELAB	.531	.113	.000
SN	.169	.072	.020
ATT	.142	.065	.030
Male/ female	-1.017	.330	.002
Block 2			
(Constant)	1.580	.639	**.014**
A21 Peace	-.747	.556	.181
SIO Vols	-.409	.567	.471
SIO Media	-2.025	.637	**.002**
SIO bags	-.419	.637	.512
SIO univ	-.742	.640	.248
Block 1 F (7,184) 18.496, p < .001, Adj. R^2 .391			
Block 2 F (12,179) 12.334, p < .001, Adj. R^2 .416, R^2 change F = 2.589, p = .027			
Note: Constant = A21 REC			

The effect size for the interaction is the amount of incremental variance explained after the effects of the covariates and predictor variables have been controlled. Generally effect sizes are small (Frazier *et al.*, 2004) with a small effect size corresponding to an R^2 change of .02. The change in Adj. R^2 between the blocks is .025, indicating an improvement in the amount of variance that can be explained by the model. This means that 2.5% of the variance in the dependent variable is accounted for by activity type after variance resulting from the theoretical variables is removed.

The hypothesis being tested in this section was

H1. Participants who are involved in activities with bottom-up communication characteristics will have higher scores on the dependent variable, behaviour (POSTELAB) than those involved in top-down activities.

This hypothesis is supported, even when controlling for differences between the groups. It is noted that gender does add explanation to the model at the significant level. Gender is not the focus of this study and as has been reported in the research design section, the

convenience nature of data collection meant that gender balance was not obtainable. Given these circumstances, conclusions are not drawn from this significant finding.

6.1.3 Differences partially explained

Having established that there are group differences, the final step is to explore what it is about the groups, from the theoretical data gathered, that may result in reporting different levels of behaviour change.

The second hypothesis in this thesis is:

> H2. Differences between the activities are explained by differing scores on either the ELM or TPB independent variables, or both.

Chapter Five introduced the concept of interaction or moderation, and how such analysis investigates the differential effect of an IV on a DV according to the values of a further quantitative IV. Group membership (or activity type) can be assessed as a moderating variable (Hardy, 1993; Jaccard & Turrisi, 2003). To clarify the specific operation of an IV in moderation analysis, the terms predictor or moderator will be used (as in Rees & Freeman, 2009).

Product terms were required in order to use hierarchical multiple regression to test for interaction. For a full analysis, 30 product terms would be needed to build a full picture of the interactions between five groups and six continuous predictor variables (INV, SC, AP, INTELAB, ATT, SN) compared with a reference group. There is a danger, however, in assessing all possible group differences and making multiple comparisons; as Hardy (1993) noted, the more comparisons performed, the more likely at least one will yield a result that appears significant.

An alternative approach was to concentrate initially on those two groups at the extremes of the top-down to bottom-up continuum of communication activities. At this stage, twelve product terms were created to analyse these two groups. Hierarchical multiple regression was performed as previously with gender controlled for in the first step, all predictors and moderators in the next and the product terms relevant to these two groups in the third. It is acknowledged that this compares the two groups of interest against a reference group that is effectively, all four of the remaining groups. At this point an optimum method of analysis would be to re-code the groups from ‘dummy’ coded (for ability to compare group against group), to ‘effects’ coding so that the two ‘extreme’ groups could be compared against the grand mean of the total sample (Frazier *et al.*, 2004; Hardy, 1993). However, as the four

groups used as the reference point here are ‘in the middle’ both theoretically on the top-down/bottom-up continuum and statistically, relative to the two extreme groups being analysed, retaining dummy coding for this exploratory stage of analysis was considered sufficient to identify potential moderating variables.

Table 6.3 shows the results of looking for evidence of moderation by comparing the two groups at the extreme of the top-down bottom-up continuum against the ‘reference’ of the remaining four groups. The R^2 change as a result of adding product terms in block three is not significant, which indicates that change between the models could be due to chance. In its use here the regression is not a test of the model but an exploration for which items within the model may be having an effect. The finding of interest is the interaction of the INTELAB product term for A21 REC but not for SIO media, which suggests that INTELAB might be operating differently by group. To investigate further, four additional product terms were created so that the four remaining groups could be investigated for INTELAB interaction.

Table 6.4 illustrates the INTELAB interaction product terms compared for all five activities against A21REC (marked constant). Four: SIO media group, SIO vols, SIO univ and A21 Peace group, report levels of INTELAB interaction which are different at the significant level. The change in Adj. R^2 is .027 at the final step, indicating that the interaction effects between groups and INTELAB explains a 2.7% of the variance in the DV POSTELAB (Frazier *et al.*, 2004).

The hypothesis investigated here was

> H2. Differences between the activities are explained by differing scores on either the ELM or TPB independent variables, or both.

There is some support for this hypothesis, namely that one variable, intention (INTELAB), operates differently according to activity, and that this contributes towards explanation of differential behaviour change reported according to activity type.

Table 6.3. Hierarchical Multiple Regression isolating INTELAB as a moderator

	Unstandardized Coefficients		
	B	**Std. Error**	***Sig.***
Block 1			
(Constant)	1.927	.677	.005
Male female	-1.233	.406	.003
Block 2			
(Constant)	1.002	.569	.080
Male female	-.547	.348	.117
INTELAB	.491	.111	.000
SN	.169	.070	.017
ATT	.130	.065	.046
SC	.045	.040	.261
INV	.030	.039	.444
AP	.027	.042	.518
A21 REC	.584	.465	.211
SIO Media	-1.461	.469	.002
Block 3			
(Constant)	1.032	.573	.073
INTELAB	.543	.126	.000
SN	.234	.092	.012
ATT	.137	.077	.077
SC	.020	.044	.654
INV	.020	.044	.651
AP	-.012	.051	.810
Male female	-.578	.352	.102
A21 REC	.849	.888	.340
SIO Media	-1.058	.521	.044
A21 REC X INV	.038	.153	.804
A21 REC X SC	.125	.147	.398
A21 REC X AP	.180	.118	.129
A21 REC X ATT	-.099	.185	.593
A21 REC X SN	-.092	.173	.597
A21 REC X INTELAB	-.992	.392	**.012**
SIO media X INV	-.153	.162	.346
SIO media X SC	.145	.129	.263
SIO media X AP	-.044	.141	.757
SIO media X ATT	.173	.236	.464
SIO media X SN	.100	.214	.641
SIO media X INTELAB	.553	.394	.162

Block 1 F (1,190) 9.241, p = .003, Adj. R^2 .041

Block 2 F (9,182) 16.588, p < .001, Adj. R^2 .423, R^2 change F = 167.741, p < .001

Block 3 F (21,170) 8.171, p < .001, Adj. R^2 .441, R^2 change F = 1.471, p = .139

Note: Constant = four omitted groups (A21 Peace, SIO Vols, SIO bags, SIO univ)

Table 6.4. Hierarchical Multiple Regression - INTELAB's role as a moderator

	Unstandardized Coefficients		
	B	**Std. Error**	***Sig.***
Block 1			
(Constant)	1.431	.578	.014
SN	.231	.075	.002
ATT	.179	.068	.009
SC	.073	.041	.078
INV	.108	.039	.007
AP	.091	.044	.038
Male/female	-.904	.348	.010
Block 2			
(Constant)	1.580	.639	.014
INTELAB	.481	.114	.000
SN	.176	.072	.016
ATT	.126	.066	.057
SC	.052	.043	.233
INV	.026	.041	.527
AP	.032	.045	.471
Male/female	-.551	.352	.120
SIO Media	-2.025	.637	.002
A21 Peace	-.747	.556	.181
SIO Vols	-.409	.567	.471
SIO bags	-.419	.637	.512
SIO univ	-.742	.640	.248
Block 3			
(Constant)	2.362	.705	**.001**
INTELAB	-.299	.323	.357
SN	.229	.072	.002
ATT	.112	.067	.097
SC	.038	.043	.372
INV	.015	.042	.717
AP	.041	.045	.359
Male/female	-.444	.348	.204
SIO Media	-2.722	.725	.000
A21 Peace	-1.854	.667	.006
SIO Vols	-1.368	.675	.044
SIO bags	-1.587	.719	.029
SIO univ	-1.671	.743	.026
SIO media X INTELAB	1.134	.394	**.004**
SIO vols x INTELAB	.806	.390	**.040**
SIO bags X INTELAB	.436	.372	.243
SIO univ x INTELAB	.836	.395	**.036**
A21 Peace x INTELAB	1.101	.388	**.005**

Block 1 F (6,185) 16.043, p < .001, Adj. R^2 .321

Block 2 F (12,179) 12.334, p < .001, Adj. R^2 .416, R^2 change F = 6.015, p <.001

Block 3 F (17,174) 9.944, p < .001, Adj. R^2 .443, R^2 change F = 2.757, p = .020

Note: Constant = A21 REC

The coefficients from Table 6.4 have been used to create an illustration in Figure 6.2 of this difference. Moderation analysis by activity used dummy variables, and the interpretation of coefficients requires the combination of coefficients (Hardy, 1993) to assess the differential values on the DV for each group. The bar on the chart representing A21REC shows the coefficient from Table 6.4 which appears under the heading 'constant' in Block 3. The sizes of the remaining bars are determined by combining the required coefficients relevant to each subgroup. For instance, the performance of SIO Media is compared against A21REC by taking the reference group co-efficient (2.362), adding the differential for SIO Media group membership (-2.722) and the interaction co-efficient SIO Media X INTELAB (1.134) resulting in a coefficient for this group of .689.

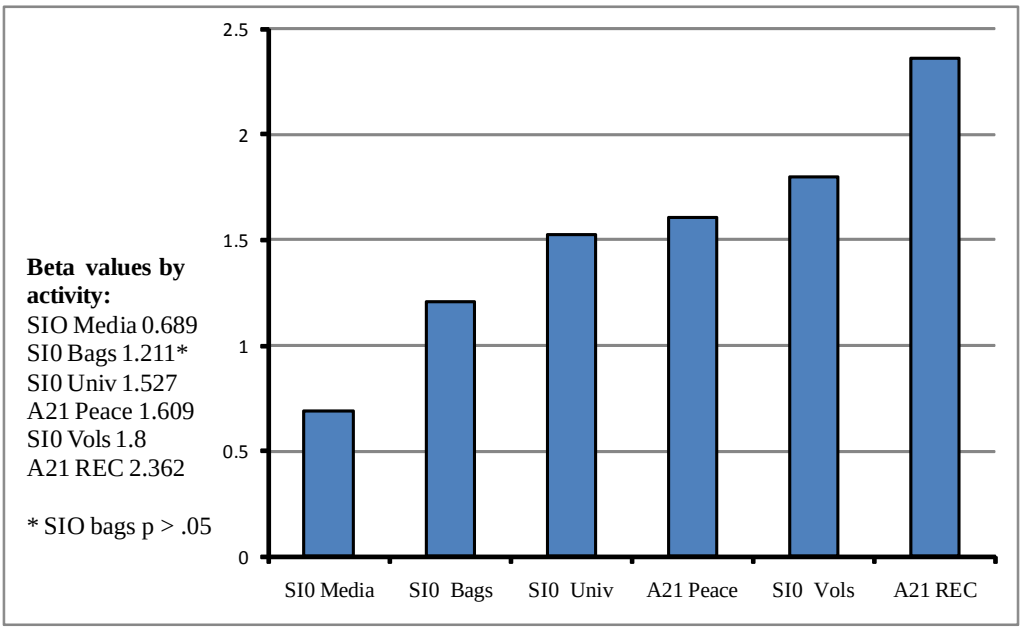

Figure 6.2. The combination of coefficients from Table 6.4 illustrate the different levels of behaviour change attributable to intention.

In summary, when covariates (including INTELAB) for the whole sample are taken into account, each unit change in INTELAB produces a 2.362 unit change in the DV for A21REC group members. Each unit change in INTELAB produces a .689 change in the DV for SIO media group members. This indicates INTELAB is more than three times as strong a predictor for A21REC as it is for SIO Media group members.

6.2 Discussion

The previous section reported the results of the statistical investigation into the ability of variables from the Elaboration Likelihood Model (ELM) and the Theory of Planned Behaviour (TPB) to explain differences between top-down and bottom-up approaches towards changing environmentally significant behaviours (ESBs).

This section provides a summary of these findings and draws on them to review the extent to which the objectives of this study set out in Chapter One have been met. The objectives were:

1. *To draw on two fields of literature – communication and participation – to identify the characteristics of bottom-up and top-down communication.*
2. *To identify the characteristics of top-down and bottom-up engagement from a series of case studies and provide a comparative evaluation of the two approaches.*
3. *To generate a theory based evaluative framework about the effectiveness of communication activities for policymakers, practitioners and the social science community. Particular focus will be on development of a clear and replicable methodology for comparing different communication strategies.*

All of these objectives are influenced by the third, which entailed conducting theoretical testing in an applied setting, or 'translational' research (Salovey & Steward, 2004). The approach taken in this thesis was to seek to understand the core elements of communication, persuasion and social change at the root of all six activities studied in order to both test theory and give guidance to future communication activities targeted at environmentally significant behaviours (ESBs). The intention of the study was also to create a research design that could be replicated in other studies of communication campaigns.

6.2.1 Statistical results summary

The hypotheses investigated the central focus of this thesis, which is that a bottom-up communication approach would have more effect on behaviour than a top-down approach. The first hypothesis examined whether participants involved in activities with bottom-up communication characteristics would report more follow-up activities than those involved in top-down activities. This hypothesis was supported, even when controlling for differences between the participants, such as levels of INV or INTELAB. Activity type explained 2.5% of the variance in reported behaviour change.

As the variables of the ELM and TPB are argued in this thesis to capture the most relevant predictors of behaviour change prompted by persuasion, a logical follow-up hypothesis was that the differences between activity types might be explained by differing scores on the theoretical variables for which data were collected. Some support was found for this hypothesis in that INTELAB was found to operate differently by group. A further 2.7% of the variance in behaviour change was accounted for by the differential operation of INTELAB.

6.2.2 Reflection

Despite the difficulties for field studies in being able to detect effects between different groups or activities (e.g. Burgoon *et al.*, 2002; Lucumí *et al.*, 2006; Marcus *et al.*, 2007; Schooler *et al.*, 1998), this study was able to do so. The analysis found support for the idea that a bottom-up approach would have more impact on behaviour change outcome than a top-down approach. It also discovered that a potential difference between the activities was in the differential impact of intention.

Table 6.5 is reproduced from Chapter Four, which set out a suggested order of communication activities with SIO Media (Switch it Off media readers) offered as an example of the operation of the most top-down approach and A21 REC (Action 21 Renewable Energy Club) as the most bottom-up, with other activities falling somewhere in between. Figure 6.3 shows the different performance of the activity groups as measured by the coefficients provided in Table 6.2 (calculations as explained earlier in this chapter, section 6.1.3).

When assessed for their bottom-up or top-down characteristics in Chapter Two, a communication mode characterised as being one-way and expert-led was identified as top-down. Of the activities reviewed in this thesis, SIO Media most matches that description. A communication mode featuring dialogue, participation and involvement in decisions was characterised as bottom-up, and A21 REC most matches that description. It can be seen that those two named two activities appear at either ends of Figure 6.3. The activities estimated as being in between the two extremes occupy those positions also (although it should be noted that with the exception of SIO media, none of the other coefficients were different from A21 REC at the significant level).

Table 6.5. Reproduced Table 4.1 from Chapter Four

Activity acronym	Description of activity and level of participation
SIO media	Participants read a two page article from their local newspaper which summarised the aims of the Switch It Off campaign and gave examples of how to save energy.
SIO univ	Teams of secondary school children (age 12-13) competed in an inter-schools 'Universally Challenged' competition which included questions about energy saving and content of the Switch it Off campaign.
SIO vols	Local authority employees volunteered to act as champions within their organisation, supporting the Switch It Off campaign by reducing their own energy use and encouraging colleagues to do the same.
SIO bags	Participants were approached in town centres and given a 'bag for life' shopping carrier containing energy saving light bulbs and literature while being engaged in conversation about the Switch It Off campaign
A21 peace	Participants approached volunteer advisers operating a stand at a peace festival in the locality. They chose the topic(s) of interest to discuss from home energy saving, locally grown food, recycling and/or transport.
A21 REC	These participants joined a renewable energy group set up to assist members adapt their homes to be more fuel-efficient/run on renewable energy. Typical projects included loft insulation, installing and running wood burning stoves and installing solar panels.

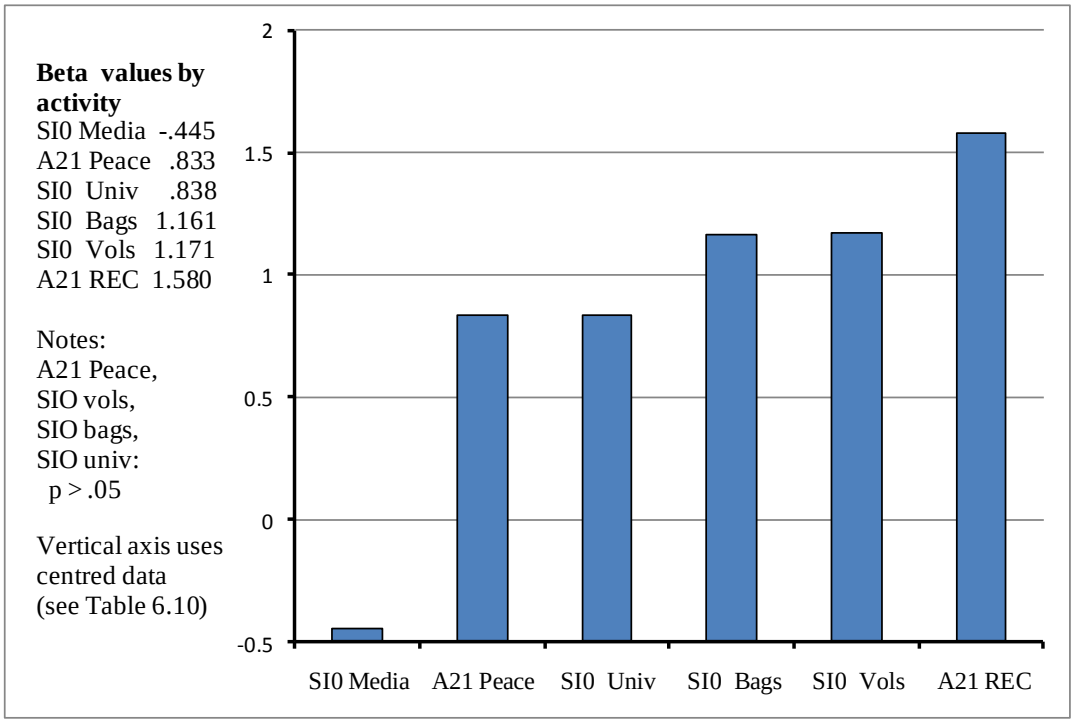

Figure 6.3 Comparison of reported behaviour by activity, controlling for theoretical variables

Despite its limitations, Figure 6.3 may offer clues about the unexplained variance between the different activities. The two 'best' performing groups (SIO vols and A21 REC) contained people who had ongoing rather than one-off involvement. They were also the groups for whom intention was a stronger predictor, even when involvement and intention were controlled, further suggesting that taking part over a period of time might strengthen intentions to change behaviour. It was noted in Chapter Five (section 5.3.2.4) that intention has two distinct elements, a decision and willingness to try (Ajzen, 1991). One possible reason offered for the difference between the activities is that willingness to try might be supported more in an environment where participants can discuss their progress with like-minded individuals. It may well be that the opportunity for dialogue, collaboration and exploration of issues from the point of view of participants contributed to self-reports of increased behavioural change

6.2.3 Review: identifying characteristics of bottom-up and top-down communication

This section will review the first objective of the research:

1. *To draw on two fields of literature – communication and participation – to identify the characteristics of bottom-up and top-down communication.*

Chapter Two reflected how two fields of literature reviewed two very similar concepts of communication approaches which operate on a continuum, with communication at the extremes representing types described in this thesis as top-down and bottom-up. The literature reviews of the two fields also identified variables which might signal what type of communication approach was being practiced. Both fields have identified that communication approaches result from the philosophical approach underlying communication activity (e.g. Grunig & Grunig, 1998; Huang, 2004; Reed, 2008; Rice & Atkin, 2002). Communication literature has focussed attention on contextual features likely to predict communication approach, such as the relative strengths of those involved in the communication process or political pressures (e.g., Kim, 2005). Participative literature has focussed more on the characteristics of different types of communication acts as a means of identifying approach (e.g. Rowe & Frewer, 2005), although also acknowledges that direction of flow is critical. The literature review also revealed that while bottom-up approaches were seen as superior (e.g. Barr, 2003; Ereaut & Segnit, 2006; Filmer-Wilson & Anderson, 2005; Owens & Driffill, 2008), there was a dearth of evidence in the form of evaluations to validate this (e.g. Abelson *et al.*, 2003; Blackstock *et al.*, 2007).

Chapter Four discussed how the combined literature review was drawn on as a guide when analysing comments made by organisers during interviews and in meetings at which proposed communication activities were discussed. The literature was used to identify how Warwickshire County Council appeared to be using a top-down approach as evidenced by organisers being unwilling to negotiate with alternative positions on climate change, and seeing the proposed campaign as one of education (see Chapter Four, section 4.2.2). The literature helped identify the alternative philosophical approach of Action 21 in that community ownership and direction, identified as a bottom-up characteristic (Bracht & Tsouros, 1990), was at the heart of its operation.

However, the analysis also revealed that, as described in the literature (e.g. Murphy, 1991), organisations were capable of operating a variety of approaches, and this led to the decision to observe communication approaches at an activity rather than organisational level.

The usefulness of drawing from two fields of literature was that it provided insight into how to examine approaches from several perspectives; looking for evidence of philosophical approach, into the context surrounding each communication activity, and at the characteristics of the communication tools used. It was found that all three were found to have a role in predicting the potential effectiveness of the chosen approach. This has an implication for policy and practice in this field, discussed in the next chapter.

6.2.4 Review: identifying top-down and bottom-up communication types in the field

The second objective of this research was:

2. *To identify the characteristics of top-down and bottom-up engagement from a series of case studies and provide a comparative evaluation of the two approaches.*

Grunig and Grunig (1992) argued that assessments of communication stance could be made through qualitative examination of artefacts, interviews with practitioners or observation of activities, and this was undertaken in order to achieve the second objective of this thesis.

Semi-structured interviews contained questions designed to find out about the context of communication situations and underlying communicating philosophy. Observation in meetings helped triangulate what was expressed in interviews with the practice of how activities were organised and spoken about, along with impressions gained of the relative importance attached to them.

This was a successful method of assessing not just the communication activities that were being planned, but what underlying philosophy drove them. However, the method used was not sufficient to order accurately the activities proposed onto a typology of communication approaches ranging from top-down to bottom-up. While the activities most representing top-down and bottom-up approaches could be identified, identification on the position of those in between on the communication continuum was less exact.

The researcher used the literature as a broad guide towards a qualitative assessment of underlying factors that guided communication approach. Blackstock *et al.* (2007) argue such a method captures the richness of people's perceptions which are then aggregated by the researcher. Some comments in interviews were given more weight when they appeared to match closely comments made in the literature and when interviewees indicated they felt that a feature, approach or intent was particularly important. While this flexibility was important in a small-scale exploratory study, it may be that a more formalised aggregation tool could be developed in which activities could be identified according to a more formalised matrix. This may prove useful in situations with bigger data collections and a team of researchers. A tighter specification for aggregation of evidence may provide a mechanism to identify a position for each activity on a communication continuum using for instance, a scoring system according to philosophy, context and choice of communication tool. However, this would need development to ensure accurate weight allocation. Limiting the scope for interpretation of relative weights to be attached to each feature needs to be balanced against the potential for loss of accuracy if an aggregation tool is not well-calibrated. A recommendation for further research to develop such a tool is found in the next chapter.

6.2.5 Review: a theory based programme evaluation

As was set out in this chapter's introduction, the meeting of the first two objectives were potentially constrained by the applied setting of the research in this thesis. The approach taken was to design a study in which key theories about persuasive communication and behaviour could be assessed in a real world setting, comparing a set of genuine rather than staged activities. This was thought to be the optimum way to devise a methodology which would need to accommodate the constraints of applied research, such as being unable to dictate design or manipulate features of communication campaigns. An over-arching objective of this research was:

3. *To generate a theory based evaluative framework about the effectiveness of communication activities for policymakers, practitioners and the social science community. Particular focus will be on development of a clear and replicable methodology for comparing different communication strategies.*

This section will consider the extent to which the evaluation framework is able to offer feedback to policymakers, practitioners and the social science community, and also the utility of the methodology for both practitioners and the social science community.

The research design used can be assessed as an evaluation methodology suitable to give feedback about communication effectiveness by its potential value to the organisers of the activities being studied. The following considerations for the organisers of these activities arose out of this research and are relevant to similar future campaigns.

Bottom-up or top-down delivery mode – knowledge about which activities get the best outcome and why is as useful to campaign planners as it is to members of the social science community. Campaigners increasingly need to consider how much behaviour change an activity delivers, compared with the cost of running it, in order to use campaign budgets effectively (Abelson *et al.*, 2003; COI, 2010; Halpern *et al.*, 2004). This research was able to highlight that media coverage, which was identified in Chapter Four (section 4.2.4) as a high input item, yielded the least behavioural return. The comparatively higher return of activities such as SIO bags, which involved engaging people in conversation about their behaviour, has also influenced future campaigning (personal communication with Ms. S, formerly Warwickshire County Council, 20 September 2010).

Newness – previous studies have questioned whether a lack of change may occur as a result of participants not receiving new information. Rosen (2000), for instance, theorised that an intervention to promote exercise had little effect on some participants because of a lack of new information provided. This might suggest a campaign to make the link between energy saving and climate change might have little effect because targets already know and believe this (and therefore their behaviour is unlikely to change because no new information has been provided).

Ceiling effect – is related to newness, in that participants may already perceive they are doing the advocated activities. Jones *et al.* (2004) hypothesised that limited evidence of behaviour change might occur as a result of the behaviour already being undertaken. If participants were already taking some of the actions suggested, possibly the easier ones, it is not unreasonable to argue that changing the remaining behaviours, or improving on existing

energy saving measures, for instance, would be harder to achieve. Several comments were made to the researcher during the course of data collection about the extent to which some participants said they were "already doing" the behaviours. The suggestion is that during the life of the Switch it Off campaign, which ran from 2006 to 2009 (with data collection in 2008), behaviours identified as "quick wins" by organisers did become familiar with participants. Feedback from the researcher contributed to a review of the Switch it Off campaign at the end of 2009, after which the activity was re-focussed to include a wider range of activities (personal communication with Ms. C, Warwickshire County Council, 15 January 2010). This demonstrates the usefulness of the feedback offered by the evaluation.

Value of source credibility – the source of a message can be a moderating factor in encouraging elaboration, which includes having a potentially negative effect (Wu & Shaffer, 1987). In the context of ESB change campaigns many participants rarely have detailed knowledge of the science behind climate change and may rely upon trust in the communicator to decide what action to take (Collins *et al.*, 2003; Lorenzoni & Hulme, 2009). Both organisations should be encouraged by the indication that source credibility did not have a differential impact according to activity, suggesting that both were considered appropriate to show leadership on this issue. This is all the more significant as local authorities have been given the responsibility for engaging local communities in voluntary behaviour changes to mitigate climate change (DCLG, 2007; Improvement and Development Agency, 2009) and community level activities are frequently argued to be the optimum way to deliver such changes (Collins *et al.*, 2003; Jackson, 2005), as discussed in Chapter One (section 1.1.1).

A particular focus of this objective was to create a research design adaptable to other communication research settings. It was identified in Chapter Three of this thesis (section 3.3.1.1) that the primary variables associated with communication are source, message, channel and receiver. The ELM allows assessment of source and message, receiver factors are assessed by the involvement variable of the ELM and TPB variables. By analysing delivery approach (channel) also, the research design used in this thesis offers a reasonably complete template for conducting an investigation into the role of communication.

It is argued here that the research reported in this thesis could be adapted, with improvements, to assess other similar persuasive communication activities, and also to evaluate different communication projects against the same criterion. The lack of such a methodology has been a key reason for the dearth of such studies (Abelson *et al.*, 2003; Blackstock *et al.*, 2007; Rowe & Frewer, 2000); this research is useful to the social science

community in that it contributes a study to partially fill this methodology gap. Specifically it responds to Rowe and Frewer's (2000) call for research to develop instruments to measure both processes and to measure participants' acceptance of the material being communicated (in this instance defined as performing the behaviour requested).

Evidence of the stability of the questionnaires capturing the ELM and TPB variables across a range of activities and groups of participants is shown by the lack of any statistically significant difference in operation across the activities. Intention was the only variable to perform differently, suggesting that as a means of gathering process information (both the process of assessing the activity and the cognitive process) the ELM and TPB independent variables perform reliably. The questionnaires are straightforward to administer and are capable of being adapted to being asked in person, over the phone, or online. However it is also acknowledged that so far unexplained variance between groups indicates that there is at least one variable as yet undefined, which could be added to the research design. This is further discussed in the next chapter.

6.2.6 Review: bottom-up methods offer a better way to change environmental behaviour

This final review section will assess the overarching aim of the research:

- *To contribute empirical evidence as to whether bottom-up methods do offer a better way to change environmental behaviour than top-down approaches.*

This research found a pattern of reported behaviour which matches the argument that bottom-up methods are more effective than top-down (Abelson *et al.*, 2003; Anable *et al.*, 2006; Ereaut & Segnit, 2006). As can be seen in Table 6.6 all four of the activities which reported the least behaviour change were one-off events, with no follow-up activity. Differences identified between the activities suggest that intention is more supported in a setting where participation is ongoing rather than one-off. Other issues have also been identified, such as agenda-setting and the extent that targets of communication activity initiate the communication. Traditional communication studies theories about the face-to-face, or relational, quality of communication being more convincing than impersonal methods (Burgoon *et al.*, 2002; Pfau, 1990) do not appear to offer guidance to campaign organisers or researchers into ESB directed communication activities. Participants in the activities did not perform according to how much face-to-face activity was involved; the

Switch it Off volunteers, for instance, may have received all of their communication by email.

Table 6.6. Top-down and bottom-up characteristics compared against findings in this research

Top-down and bottom-up characteristics, as identified in Chapter Two	Level of activity*	Description of activity and level of participation
Top down: • expert-led • paternalistic • authoritarian • asymmetrical or even one-way • scientific persuasion instructiona, transmission of information **Bottom-up:** • dialogue • negotiation • deliberation • participation collaboration • partnership • involvement in decision-making	SIO media	Participants read a two page article from their local newspaper which summarised the aims of the Switch it Off campaign and gave examples of how to save energy.
	A21 peace	Participants approached volunteer advisers operating a stand at a peace festival in the locality. They chose the topic(s) of interest to discuss from home energy saving, locally grown food, recycling and/or transport.
	SIO univ	Teams of secondary school children (age 12-13) competed in an inter-schools 'Universally Challenged' competition which included questions about energy saving and content of the Switch it Off campaign.
	SIO bags	Participants were approached in town centres and given a 'bag for life' shopping carrier containing energy saving light bulbs and literature while being engaged in conversation about the Switch it Off campaign
	SIO vols	Local authority employees volunteered to act as champions within their organisation, supporting the Switch It Off campaign by reducing their own energy use and encouraging colleagues to do the same.
	A21 REC	These participants joined a renewable energy group set up to assist members adapt their homes to be more fuel-efficient/run on renewable energy. Typical projects included loft insulation, installing and running wood burning stoves and installing solar panels.

* as identified in Figure 6.3, from least reported behaviour at top to most reported behaviour (bottom).

The comparison of communication approaches may indicate, as argued in Chapter One, that information campaigns alone are not as equipped as other methods to deliver every step required to change behaviour long term (Darnton, 2004; Jackson, 2005). While they may be useful in raising awareness and building knowledge, it is argued that activities which involve collaboration and partnership may be more suited to deliver later steps in the behaviour change chain suggested in Figure 5.1 and Figure 5.3 of this thesis.

In summary this research was able to devise a method to assess different communication approaches. However, with the notable exception of identifying a differential role for intention was not able to fully explain the variance in reported behaviour. This is discussed in the further research section of Chapter Seven.

6.3 Limitations

Limitations with this research are largely associated with issues associated with the group (activity) comparison design. In order to evaluate events in the field there were several compromises made which meant the ideal of random sampling, random assignment and deliberate manipulation of strong or weak situations was not possible. Random sampling offers the best chance that differences between groups are due to the activity and not to differences in participants. The convenience nature of data collection, discussed in Chapter Five, makes it more difficult to claim that the findings of this study would, for instance, be applicable in other cases. The surveying of different age groups, activity types and geographical areas supports the case that the sample as a whole is similar to the population of Warwickshire. It is not as easy to argue convincingly that the differences identified between the activities are not as a result of their comprising participants who are who are markedly different from each other. It is recommended that this study be replicated under different geographic and situational conditions. The ideal would be to track a larger scale suite of activities with the possibility of random rather than opportunistic sampling. One particular improvement to design would be to identify a better way of sampling the views of media readers rather than the quasi-experimental approach taken here of surveying a group of similar-age students.

Another limitation is that all of the measures used self-reports, and it is acknowledged that these can lead to socially desirable responding (Johnson & Eagly, 1989). Self-reporting is commonly used in behavioural research (Armitage & Conner, 2001; Conner *et al.*, 2007b; Updegraff *et al.*, 2007) and was common across all activities, but it is possible that some participants might have felt greater internal pressure to respond in a socially desirable way than others.

There was no opportunity for the researcher to survey ahead of the communication activity. This effectively means this is a post-test only design, with no pre-test which would have provided data to control for attitudes held ahead of the campaign activity. Also there was no control group with an implication for effect sizes in that every group examined should be making some alteration in behaviour.

Steps were taken to avoid overlapping effects caused by participants in one activity being exposed to the effects of another (discussed in sections 3.5.1.1 and 5.6). Deliberate avoidance of overlapping effects led to a further limitation. A criticism of any intervention research which aims to evaluate differences between activities is that it cannot at the same

time assess the combined influence of multiple channels. It is acknowledged that the nature of this research has meant that each activity has been examined in isolation, when much guidance about encouraging sustainable consumption advises that no one initiative has all the answers and use of multiple initiatives and channels is preferred (Chess & Purcell, 1999; Darnton, 2004; Defra, 2008; Petts & Leach, 2000) .

The opportunistic nature of the data gathering meant space on the questionnaires was at a premium. Some of the questions needed an 'already doing it' category. It is the researcher's observation from discussions with some participants that some people may not have reported significant behaviour change because they were already taking several of the activities discussed, and therefore little scope to change behaviour further.

The time period between data collection points was set at four to five weeks. It is not unreasonable to argue that some activities take longer than others to implement. Returning home with intentions to reduce thermostat temperature could be done immediately, but adding solar panels to a roof requires a longer time period to elapse. A future study might consider a third data collection point, for instance at six months. Extra data collections could also allow information on variables to be collected in the correct causal order, enabling intention to be assessed as a distinct step.

A control group was not used because many of the questions about the activity would not have been meaningful. A future study could consider a more limited control study where questions omitted the ELM independent variables. This could have been useful to provide a reference for levels of behaviour change with which to compare the six groups (e.g. Pfau, 1990).

Despite these limitations, the findings from this research suggest important conceptual and practical considerations for tailoring communication campaigns in order to encourage behaviour change. These are further discussed in Chapter Seven.

7 Conclusion

> *If turned to real world issues rather than relatively trivial laboratory issues, communication and persuasion theory may hold the keys to a better life.* (Johnson *et al.*, 2005, p. 656)

This chapter will recommend further research that could build on both what has been learned and respond to new questions arising from this study. It will conclude by identifying implications for policy and practice that have arisen from this study for those interested in supporting change associated with environmentally significant behaviours (ESBs).

7.1 Further Research

Build on exploratory study - the first recommendation addresses design issues. It is recommended that further research might address some of the methodological limitations highlighted in the previous chapter which arose from a relatively small scale exploratory study. Further larger scale research might attempt to replicate this study but use, for instance, random sampling. Despite the potential problems of achieving this in an applied setting (discussed in Chapter Three), larger projects with more participants engaged and reached in each activity have achieved this (e.g. Evans *et al.*, 2009; Stead *et al.*, 2005).

Use measured variables as design as well as evaluation tools - this study tracked pre-existing communication activities not informed by communication or behavioural theory. It is recommended that campaigns might achieve stronger results if measured ELM variables were used to assess materials at the design stage, as has been done with the TPB (e.g. Brown, Ham, & Hughes, 2010; Stead *et al.*, 2005). This would allow campaigners to ensure that information is provided in a maximally involving manner and easy to process, as well as uncovering whether actions proposed are perceived as too difficult or counter to the norms of important others. This information could help refine campaigns or uncover whether other policy levers, such as the economic or legislative measures discussed as alternatives in Chapter One (see Table 1.1) should be used alongside, or instead of, a communication campaign.

Further investigate different outcomes across activities - Hu and Sundar (2010) argued that communication mode would add explanation to the Theory of Reasoned Action (TPB not addressed). In this research communication mode, or activity type, was shown to explain a further 2.5% of the variance in behaviour. Two variables in this research which might have assessed the differential effects of communication were ability to process (AP)

and argument quality (AQ). AP was assessed according to the 'utility' of the method, but was not found to be a moderator of behaviour according to activity type. The ELM variable AQ failed to predict behaviour. It is possible that AQ was difficult to assess for some of the activity groups. While participants reading media content might easily be able to identify the message being communicated, this may have been harder to do for those participants who predominantly thought they were actively seeking out information rather than having it communicated. While keeping the questions as similar as possible across activity groups in order to facilitate comparison, this approach may have led the question sets to be less meaningful to some groups. Pfau (1990) assessed the quality of a message across different communication channels and was more flexible in adjusting questions so that they were meaningful in each situation. It is recommended that in different communication settings, AQ questions be piloted not just with one group but with all groups for whom a survey will be used.

Alternatively, further variables may account for the differences in activities, which if identified could also be used to maximise levels of behaviour change. There are several possibilities.

The first is that the variance is accounted for by a characteristic within participants. Further research might incorporate variables to try to tap into differences between participants, such as the New Ecological Paradigm (Dunlap *et al.*, 2000) measure of pro-environmental orientation, or pre-existing attitudes or behaviours (Whitmarsh & O'Neill, 2010).

The second is that variance is accounted for by some aspect of the activity type unmeasured by ELM and TPB theoretical variables. The assessment of which activities had bottom-up and top-down characteristics was completed by the researcher with guidance from the literature review and discussions with campaign organisers. A further research project might concentrate on identifying potential influential characteristics more rigorously, such as being supportive of dialogue, collaboration and exploration of issues from the point of view of participants. This could be achieved by use of other theory to identify the features of participative methods that make it more effective, such as by operationalization of the Reasonable Person Model (Kaplan & Kaplan, 2009), or as Hardeman *et al.* suggest (2002), Bandura's Social Cognitive Theory (1986).

Explore further the differential effect of intention – intention did explain a small amount of differential in the behaviour change attributable to activity type. In Chapter Four it was identified that intention can be separated into two functions, goal and implementation.

Given that intention interacted with involvement and was stronger for certain groups, it is worth analysing these two functions separately (see also Conner & Armitage, 1998; Gollwitzer, Sheeran, & Mark, 2006). This would help address a deficiency of the TPB acknowledged by its own architects, who agree that the theory taps changing intention better than supporting implementation (Fishbein & Ajzen, 2005).

Further investigation of the communication continuum – this idea is linked to the two previous proposals to investigate differences between activities, but approaches the problem from a different starting point. The explorative research undertaken in this study to identify potential top-down and bottom-up characteristics was sufficient to identify those at extremes of the continuum, but not to offer clarity about the position of those activities which fell between. As a result, it was not possible to offer insight into the reason for the performances of those found to operate in middle positions of the continuum. Further research might identify with more clarity a mechanism for how to assign a communications activity on a top-down bottom-up continuum, and hence lead to accurate delivery of effective bottom-up approaches. This would build on the work of others in this area, combining the findings thus far from two fields of study examining communication (e.g. Cameron, Cropp, & Reber, 2001; Grunig, 1992) and participation approaches (e.g. Abelson *et al.*, 2007; Blackstock *et al.*, 2007; Rowe & Frewer, 2005) . As an example, this could be based on an existing typology of mechanisms such as that of Rowe and Frewer (2005) but featuring an extra specification for the level of symmetry or asymmetry of communication stance of the communicator, not just the communication flow offered by the chosen mechanism.

7.2 Implications for policy and practice

Chapter One set out a cocktail of objections to the use of communication to change environmentally significant behaviours. It also reflected the importance of and continued reliance on such activity, including the decision of the coalition government to assign community engagement to local government. Even when communication is criticised, it is still advocated as having a key role (Kennedy *et al.*, 2009; Lorenzoni *et al.*, 2007).

The key aim of this thesis was to begin to contribute to the evidence gap that bottom-up methods work best, albeit in an exploratory assessment for which generalisability cannot be claimed. As has already been reviewed in this chapter, there is tentative support for the idea that bottom-up methods deliver more behaviour change, and as suggested in Chapter One, this may be as a result of such methods not having an 'instructional' nature. The differences

in approach may also be due to who sets the agenda about what to discuss, and also in that participative methods offer a more supportive environment to nurture willingness to try.

From an evaluator's or policy maker's point of view the finding that bottom-up approaches might work better at turning intentions into behaviours needs to be compared with the numbers of people that top-down methods reach. Top-down methods using the media are generally seen as a low cost way to reach a mass audience (Abelson *et al.*, 2003; Collins *et al.*, 2003; Murphy, 1994) and are a traditional way of raising awareness (Balch & Sutton, 1997).

This research is timely because communicators in the UK are now being challenged to do more than raise awareness. They are being encouraged to contribute towards changing behaviour. If communicators are interested in moving their audiences beyond awareness to implementation, they need to focus on four challenges:

- set realistic campaign objectives which acknowledge that as more ambitious communication effects are sought, such as change in intentions or behaviour, other variables or barriers are likely to play a stronger role (Balch & Sutton, 1997);
- ensure other policy levers are also in use to tackle those other barriers, such as cost (Darnton, 2004);
- pre-test and track the impact of communication using a combination of communication and behavioural theory variables;
- ensure bottom-up methods are highly featured communications approaches when it is not awareness, but behaviour change, that is required.

This research has shown that the manner in which information is communicated can make a worthwhile difference. However, policy maker and communication professionals need to be aware that simply choosing 'bottom-up' tools may not be successful if the choice is mechanically based on a typology focussed largely on the effectiveness of processes. Such choices need to be made alongside an appreciation of the requirement for a more symmetrical philosophical approach to communications on behalf of the communicator. It may be found that 'bottom-up' tools may not be wholly successful if the underlying communications stance remains the same.

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(All web pages up to date as of 14 July 2011.)

Appendix 1. Literature search procedures

In Chapter Three literature was reviewed to update the analysis in 2003 of comparative participation studies by Abelson *et al*., and to facilitate a similar review of communications comparisons. Two literature searches were undertaken (last reviewed and revised in August 2010). The first was designed to find studies comparing participation approaches and the second comparing communication channels and approaches. The Web of Science, Google Scholar, Sage Journals Online and Science Direct were all used, with a variety of search terms, including *public participation, evaluation, public involvement, public engagement, community participation, participatory research methods,* and *communication approach*.

In order to capture comparative studies of communication modes search terms included *communication processes, communication approach, communication method, evaluation, communication behav** (use of this symbol enables all spellings of behaviour to be included in the search), *between subjects, independent design, symmetrical, comparative study,* and *quasi experiment*. The search terms were suggested by keywords provided in literature already reviewed in this chapter.

Appendix 2. Action 21 questionnaire (pilot)

(This appendix contains a copy of the first survey, piloted with visitors to the Action 21 stand at Leamington Peace festival)

The questionnaire that follows is part of a piece of research being undertaken for a PhD research study at the Institute of Environment and Sustainable Development at De Montfort University. Your responses will be kept confidential and anonymous – all forms will be collated at De Montfort University and held securely. No information connecting responses to any individual will be passed on to Action 21.
The questionnaire should take about 15 minutes to complete. You are free to stop at any time or skip any questions you don't want to answer. I'll need your phone number so that in three weeks time I can ring you (at a time convenient to you) and do a second short survey over the phone.

Name

Live in Warwickshire? Yes ☐ No ☐

Phone number:

Time preferences re phone calls:

weekdays ☐ weekends ☐
a.m. ☐ p.m. ☐ eve. ☐ any ☐

Are you ?

Male ☐ Female ☐

Under 20 ☐ 20-29☐ 30-39☐ 40-49☐ 50-59 ☐ 60 or over ☐

What is the ***main topic you discussed/thing you were interested in***?

My questions will be about this.

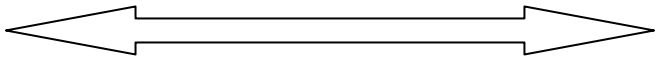
Q1. Did you find **what was discussed**:

	Strongly disagree	**Tend to Disagree**	**Neither agree nor disagree**	**Tend to Agree**	**Strongly agree**
Believable	☐	☐	☐	☐	☐
Clear	☐	☐	☐	☐	☐
Credible	☐	☐	☐	☐	☐
Unconvincing	☐	☐	☐	☐	☐
Not relevant to me personally	☐	☐	☐	☐	☐
Unmemorable	☐	☐	☐	☐	☐

Q2. Did you find Action 21 an ***organisation*** that is:

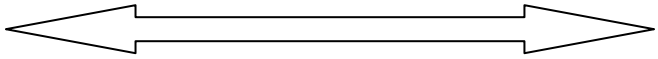
	Strongly disagree	**Tend to Disagree**	**Neither agree nor disagree**	**Tend to Agree**	**Strongly agree**
Credible	☐	☐	☐	☐	☐
Trustworthy	☐	☐	☐	☐	☐
Suited to an activity like this	☐	☐	☐	☐	☐
Expert	☐	☐	☐	☐	☐
Competent	☐	☐	☐	☐	☐
Knowledgeable	☐	☐	☐	☐	☐

Q3. I'd like you to rate the adjectives below for how well they represent your feeling about the ***issue*** being discussed: (for instance, if you feel the issue was highly unimportant, tick the box nearest unimportant. The centre box would be neutral in all cases)

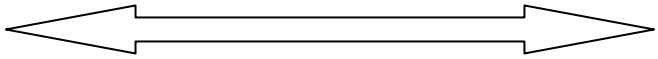


important to me	☐	☐	☐	☐	☐	unimportant to me
relevant to me	☐	☐	☐	☐	☐	irrelevant to me
exciting to me	☐	☐	☐	☐	☐	unexciting to me
appealing to me	☐	☐	☐	☐	☐	unappealing to me
fascinating to me	☐	☐	☐	☐	☐	mundane to me
involving to me	☐	☐	☐	☐	☐	uninvolving to me
worthless to me	☐	☐	☐	☐	☐	valuable to me
boring to me	☐	☐	☐	☐	☐	interesting to me
means nothing to me	☐	☐	☐	☐	☐	means a lot to me
not needed by me	☐	☐	☐	☐	☐	needed by me

Q 4 Now I want to talk about the ***method*** of communication and again ask you to rate how positively or negatively the following words describe how you found the ***method*** of communication:



inefficient	☐	☐	☐	☐	☐	efficient
unreliable	☐	☐	☐	☐	☐	reliable
helpful	☐	☐	☐	☐	☐	unhelpful



useful	☐	☐	☐	☐	☐	not useful
enjoyable	☐	☐	☐	☐	☐	not enjoyable
engaging	☐	☐	☐	☐	☐	not engaging
interesting	☐	☐	☐	☐	☐	boring
challenging	☐	☐	☐	☐	☐	dull
involving	☐	☐	☐	☐	☐	uninvolving

Q 5 As a result of this initiative (talk/discussion/item you have read) how likely is it that you will:

	Very likely	**Quite likely**	**Neutral**	**Unlikely**	**Very unlikely**
think further about the issues raised?	☐	☐	☐	☐	☐
change your views	☐	☐	☐	☐	☐
change any activities in your personal or work life	☐	☐	☐	☐	☐
speak positively of what has been talked about to a friend or colleague?	☐	☐	☐	☐	☐
become more interested in this issue when you see or hear it discussed by others	☐	☐	☐	☐	☐
seek out further information on this topic	☐	☐	☐	☐	☐

That’s it. Many thanks for your co-operation.

Appendix 3. Action 21 follow-up questionnaire (pilot)

(This is a copy of the second survey, piloted with visitors to the Action 21 stand at Leamington Peace festival, and conducted by telephone four to five weeks after the event.)

Name Previous participant ID:

Date of this questionnaire:

Reminder - questionnaire is part of research undertaken for a PhD research study at the Institute of Environment and Sustainable Development at De Montfort University.
Responses will be kept confidential and anonymous – all forms collated at De Montfort University and held securely. No information connecting responses to any individual passed to Action 21.
The questionnaire should take about 10 minutes. You can stop at any time or skip any questions you don't want to answer. **Last time we spoke you had been interested in what A21 had to say about:**

Elaboration

As a result of this initiative, to what extent have you -

	A great deal	**To some extent**	**Not very much**	**Not at all**
Thought further about the issues raised?				
Changed any activities in your personal or work life?				
Spoken positively of what was talked about to a friend or colleague?				
Become more interested in this issue when you have seen or heard it discussed by others				
Sought out further information on this topic				

SN questions

Still thinking about the main message (repeat it back to them) I want you to think about people who are important to you – you can pick neighbours, friends, work colleagues as appropriate to you. To what extent would these people...

	A great deal	**To some extent**	**Not very much**	**Not at all**
think that (main message) was important?				
disapprove of you discussing the topic with them?**				
be interested in this topic themselves?				
be taking action with this topic?				
expect you to take action on this topic?				

PBC questions

Please rate these statements for how well they describe your position, on the following scale…

	Strongly disagree	**Tend to Disagree**	**Neither agree nor disagree**	**Tend to Agree**	**Strongly agree**
I am fully able to control whether I include (topic) into my life (ie do you rely on others?)					
It would be easy to include (topic) into my life					
I have the right facilities to include (topic) into my life					
I have enough information to include (topic) into my life					
I would like to do this activity but I don't know if I can					

ATT questions

Just remembering that we are still talking about the (topic) you took away from the event…

	Strongly disagree	**Tend to Disagree**	**Neither agree nor disagree**	**Tend to Agree**	**Strongly agree**
My taking action (on this topic) is convenient to me					
My taking action on this topic would be/is right for me					
The advantages of taking action outweigh the disadvantages for me.					
My taking action on this topic … is NOT effective**					
…is NOT worth the effort.**[20]					

My questions are complete. Thank you.
Is there anything else on this topic that you would like to add?

Should you wish to contact me: 0116 2551 551 ext 6847 or cwilson@dmu.ac.uk

[20] ** Denotes questions later code-reversed.

Appendix 4. Switch it Off media readers questionnaire (post-pilot)

(This is the revised first survey, with some questions from the earlier pilot omitted as a result of reliability testing. This version was used for the SIO media readers activity.)

The questionnaire that follows is part of a piece of research being undertaken for a PhD research study at the Institute of Environment and Sustainable Development at De Montfort University.
Your responses will be kept confidential and anonymous – all forms will be collated at De Montfort University and held securely. No information connecting responses to any individual will be passed on to Warwickshire County Council.
The questionnaire should take about 15 minutes to complete. You are free to stop at any time or skip any questions you don't want to answer. I need your name only so that I can match up this survey and a further short set of questions in four weeks time.

Date:

Name:

Do you live in Warwickshire? Yes ☐ No ☐

Are you ?

Male ☐ Female ☐

Under 20 ☐ 20-29☐ 30-39☐ 40-49☐ 50-59 ☐ 60 or over ☐

If unable to researcher in person direct please despatch to:

Caroline Wilson
Institute of Energy and Sustainable Development
De Montfort University
Queens Building Room 1.05
The Gateway
Leicester LE1 9BH

Enquires to: cwilson@dmu.ac.uk

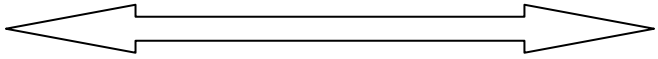
Q1. Do you find the message of the Switch it Off campaign:

	Strongly disagree	Tend to Disagree	Neither agree nor disagree	Tend to Agree	Strongly agree
Believable	☐	☐	☐	☐	☐
Clear	☐	☐	☐	☐	☐
Credible	☐	☐	☐	☐	☐
Unconvincing	☐	☐	☐	☐	☐
Unmemorable	☐	☐	☐	☐	☐

Q2. Do you find Warwickshire County Council an *organisation* that is:

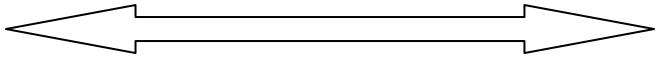
	Strongly disagree	Tend to Disagree	Neither agree nor disagree	Tend to Agree	Strongly agree
Credible	☐	☐	☐	☐	☐
Trustworthy	☐	☐	☐	☐	☐
Suited to an activity like this	☐	☐	☐	☐	☐
Expert	☐	☐	☐	☐	☐
Competent	☐	☐	☐	☐	☐
Knowledgeable	☐	☐	☐	☐	☐

Q3. This section is about *you*. Please rate the adjectives below for how well they represent your feeling about the issue behind the Switch it Off campaign: (for instance, if you feel it is highly unimportant, tick the box nearest unimportant. The centre box would be neutral in all cases). Switch it Off is:



important to me	☐	☐	☐	☐	☐	unimportant to me
relevant to me	☐	☐	☐	☐	☐	irrelevant to me
exciting to me	☐	☐	☐	☐	☐	unexciting to me
appealing to me	☐	☐	☐	☐	☐	unappealing to me
fascinating to me	☐	☐	☐	☐	☐	mundane to me
involving to me	☐	☐	☐	☐	☐	uninvolving to me
worthless to me	☐	☐	☐	☐	☐	valuable to me
boring to me	☐	☐	☐	☐	☐	interesting to me
means nothing to me	☐	☐	☐	☐	☐	means a lot to me

Q 4 Now I want to talk about the *method* of communicating and ask you to rate reading an article in a newspaper as a means of communication:



inefficient	☐	☐	☐	☐	☐	efficient
helpful	☐	☐	☐	☐	☐	unhelpful
useful	☐	☐	☐	☐	☐	not useful
enjoyable	☐	☐	☐	☐	☐	not enjoyable
engaging	☐	☐	☐	☐	☐	not engaging
interesting	☐	☐	☐	☐	☐	boring
challenging	☐	☐	☐	☐	☐	dull
involving	☐	☐	☐	☐	☐	uninvolving

Q 5 As a result of reading this article how likely is it that you will:

	Very likely	Quite likely	Neutral	Unlikely	Very unlikely
think further about the issues raised?	☐	☐	☐	☐	☐
change any activities in your personal or work life	☐	☐	☐	☐	☐
become more interested in this issue when you see or hear it discussed by others	☐	☐	☐	☐	☐
seek out further information on this topic	☐	☐	☐	☐	☐

That’s it. Many thanks for your co-operation. Please return this form to the researcher.

Appendix 5. Switch it Off media readers follow-up questionnaire (post-pilot)

(This is the revised second survey, with some questions from the earlier pilot omitted as a result of reliability testing. This version was used for the SIO media readers activity.)

This questionnaire forms part of a research project being conducted as part of a PhD study at the Institute of Environment and Sustainable Development at De Montfort University. PLEASE ONLY TAKE PART IF YOU ALSO TOOK PART IN THE SURVEY FOUR WEEKS AGO.
Your responses will be kept confidential and anonymous – all forms will be collated at De Montfort University and held securely. No information connecting responses to any individual will be passed on to Warwickshire County Council.
The questionnaire should take about 10 minutes to complete. You are free to stop at any time or skip any questions you don't want to answer. I need your name only so that I can match up this survey with your previous responses.

Date: November 20, 2008
Name:

Last time we spoke was just after you had read a piece of media coverage about the Switch it Off campaign, which encouraged people not to waste electricity as a result of leaving electrical items on standby or leaving lights on in empty rooms.

As a result of reading about Switch it Off, to what extent have you -

	A great deal	**To some extent**	**Not very much**	**Not at all**
Thought further about the issues raised?				
Changed any activities in your personal or work life?				
Become more interested in this issue when you have seen or heard it discussed by others				
Sought out further information on this topic				

Still thinking about the Switch it off campaign, I want you to think about people who are important to you – you can pick neighbours, friends, work colleagues as appropriate to you.

To what extent would these people...

	A great deal	**To some extent**	**Not very much**	**Not at all**
think that switching off unused appliances was important?				
be interested in this topic themselves?				
be taking action with this topic?				
expect you to take action on this topic?				

Please rate these statements for how well they describe your position, on the following scale…

	Strongly disagree	**Tend to Disagree**	**Neither agree nor disagree**	**Tend to Agree**	**Strongly agree**
I am fully able to control whether I switch off items left on standby or unused (e.g. do you rely on others?)					
It would be easy to switch off things left on standby					
I have the right facilities to take this action					
I have enough information to take this action					

	Strongly disagree	**Tend to Disagree**	**Neither agree nor disagree**	**Tend to Agree**	**Strongly agree**
My switching off is convenient to me					
The advantages of switching off outweigh the disadvantages for me.					
My switching off is NOT effective					
…is NOT worth the effort.					

My questions are complete. Thank you.
Is there anything else on this topic that you would like to add?

Should you wish to contact me: 0116 2551 551 ext 6847 or cwilson@dmu.ac.uk

Appendix 6. Coventry Evening Telegraph article used with media readers

THE TELEGRAPH, MONDAY, OCTOBER 20 2008

Coventry Telegraph

GoGreen

THINK GLOBAL ■ ACT LOCAL

Brought to you in partnership with the following organisations:

Coventry City Council

JAGUAR

LAND ROVER

... FIRST CHOICE

garden organic

habitat

FOC Energy

midland heart

Waitrose

Lake

TOM WHITE WASTE LIMITED

You could SAVE £100s on your household energy bills!

Call 024 7644 4111

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Enquiries also welcome from Landlords, Estate Agents, Solicitors and Commercial Agents

GO GREEN SPECIAL – On the launch day of a campaign to

Time to make saving energy

switch it off ...

TODAY kicks off Switch It Off week, a countdown to Friday's big two-hour switch-off across Coventry and Warwickshire.

Every day we'll bring you stories of people who are fighting rising fuel bills by making the most of their electricity and cutting down on waste. Schools, homes and businesses have all cleaned up their energy efficiency this year – and so can you.

A TELEGRAPH GO GREEN CAMPAIGN

■ SEEING THE LIGHT... Left, teaching assistant Zahia Milkom, with Callum Turley, eight, a helping hand to switch off the lights. Right, Zahia with (from bottom left) Daisy-Mae Marwood, 6, Katie Barnes, 6, Callum Turley, 6, and Ella Fairey, 6. Pictures: Joe Bailey

By Mary Griffin, ENVIRONMENT REPORTER

MILLIONS of pounds are spent every year on heating and lighting schools.

Coventry schools want to make a giant leap in their energy efficiency by switching to green technologies.

The Big Switch Off Week will see £300million ploughed into building five new secondary schools in Coventry and refurbishing all others over the next five years.

Investment in renewable energy so far has included:

■ Grundd-source heat pumps at Allesley Primary School and Whitley Abbey and Stoke Park Sixth Form Centre, using the earth's natural warmth to heat the buildings.

■ Air-to-water heating at Gosford Park Primary School.

■ Woodchip boilers at Stivichall Primary, Stanton Bridge Primary and the new Castlewood Broad Spectrum High School.

■ Grass roofs and water recycling for toilets at Moseley Primary and Willenhall Community Primary School.

"We have light monitors in place all year round and it's part of our daily routine."

Coventry schools want to make a giant leap in their energy efficiency by switching to green technologies.

The Big Switch Off Week will see £300million ploughed into building five new secondary schools in Coventry and refurbishing all others over the next five years.

Two children in each class were put in charge of switching off lights and computers when everyone left the room.

And the school spread the word about the secret check, urging every one to try and think more about energy.

The secret week we put stick-on all our switches reminding people to turn off as they leave the class, and we appointed light monitors.

Teaching assistant Zahia Milkom said: "For the follow-up week I did my check again at the start of the week, and the whole week's been a success. The children have made sure that lights and equipment was switched off at playtime and lunchtime.

"We saved 14 per cent of our energy the first week, and I'm sure we'll do even better this week. We couldn't believe the lights were left on during playtime or

"Now, we're very much into a habit.

Turn off unwanted lights and appliances, we look at how two schools are cutting fuel bills

When nature gave the switch to me a bad reception

"HAND me the axe," I barked, wild-eyed and ready to kill a tree.

"We don't have an axe," said him indoors. "We have a saw."

"That'll do. Give it here," I snapped, eyeing up the woodland.

"You've seen the headlines," he said. "CRAZED ENVIRONMENT REPORTER JAILED FOR ASSAULTING TREE."

He was right.

Because something stands between you and your telly, murderous thoughts are entirely understandable.

We've been living without TV for four months now. We've moved on, and for three months we sat tight.

Hunting around the varieties for entertainment had a certain charm.

And at the highs and lows of last night's Big Brother I was blissfully unaware.

But the recession came and I missed the nailbiting finale.

Now, not a jot of the billion pound Beijing Olympic bonanza.

And I'm set in when I realised we couldn't afford a digital TV upgrade for at least another year.

So last week I called energy efficiency experts who did the obligatory sucking of teeth that says: "This is gonna cost you," before quoting a £4,000 figure to bring the street at a little cluster of trees.

This beacon of green, he said, was disrupting the signal for the satellite dish that connected to all the surrounding homes sporting aerials 30ft high.

When the tree rage subsided I switched on the box and stuck an radio antenna out at the redundant telly in the corner.

It's not perfect – the picture comes in only in black and white – but I can live with that.

If I can cope without the box for an entire year, hopefully we can all Switch It Off for a week.

Mary Griffin

Which businesses are going to Switch it Off?

AMONG the businesses supporting the Switch It Off campaign are:

■ Snitterfield Actioning Climate Change
■ The Energy Saving Trust
■ West Midlands Fire Service
■ Coventry City Council
■ The Ricoh Arena
■ West Orchard Shopping Centre
■ The Belgrade Theatre
■ Coventry University
■ Warwick University
■ Severn Trent
■ Waitrose
■ Carbon Positive Energy Efficiency Advice Centre

Children spread the message

HOLY FAMILY Primary School in Penny Park Lane, Coventry, is a green school.

Each class has monitors to make sure lights and computers are switched off and pupils are set to keep the heat in.

Teacher Paulina Johnson, who runs Holy Family's eco-warriors' group, said: "We've started to meet every Tuesday and a couple of them take responsibility for checking the school's energy readings. We can then compare the readings and find out how we're doing."

and light the council's buildings.

Kevin Palmer, energy manager at Coventry City Council, said: "We have started to look at how energy per cost into buildings and two-thirds of that goes into schools.

"Improving energy efficiency in schools is good for the city as it brings down carbon emissions.

"It's free, and it's also good for teaching children about energy efficiency has a knock-on effect because they'll take it home with them and carry it forward into the future."

Get involved...

ON FRIDAY, between 4.30pm and 6.30pm, every home and business in Coventry and Warwickshire is invited to be part of a massive switch-off.

Last year community clubs held their meetings by candlelight, scout groups got the chance to earn their cooking badge on the gas jelly and spent the evening playing games.

Organisers hope that by saving enough energy in two hours to light nearly 3,000 homes for a year.

All you have to do is switch off all unwanted lights, computer screens, TVs, photocopiers and printers and leave them on standby. Then, at 4.30pm on Friday, mark the switch-off. let us know by calling Mary Griffin on 024 7650 0370.

TELL US YOUR GREEN STORY

If you're trying to make your home greener, or you've got a great idea for saving energy, please contact us and let us know about it.

Email your ideas to greenteam.letters@ntlworld.com, write to us at Coventry Telegraph, Corporation Street, Coventry, CV1 1FP, or visit our website at www.coventrytelegraph.net/gogreen

Appendix 7. Additional descriptives of theoretical variables

The table presented here shows means, standard deviations, minimum and maximum scores for each activity on each variable.

Activity		ELM IVs				TPB IVs				DV
		INV	AP	SC	AQ	ATT	SN	PBC	INTELAB	POSTELAB
A21 peace	N	31	31	31	31	31	31	31	31	31
	Mean	1.62	2.47	1.81	-.04	-.040	.85	-2.01	.45	.61
	Min	-9.47	-7.11	-4.52	-8.10	-9.69	-5.70	-11.94	-3.65	-5.10
	Max	5.53	6.89	7.48	3.90	2.31	4.30	4.06	2.35	5.90
	SD	4.61	4.03	3.89	3.67	3.47	2.19	4.49	1.87	3.18
SIO vols	N	33	33	32	31	32	32	33	33	33
	Mean	1.34	-1.14	.61	.51	.72	.77	.30	.53	.81
	Min	-7.47	-7.11	-12.52	-4.10	-6.69	-3.70	-11.94	-4.65	-5.10
	Max	5.53	6.89	7.48	3.90	2.31	4.30	4.06	2.35	4.90
	SD	3.88	3.61	4.21	2.69	2.08	2.00	4.49	1.70	2.01
SIO media	N	34	34	34	34	34	33	34	34	34
	Mean	-2.68	-2.72	-1.78	-1.01	-1.04	-.73	.79	-.83	-2.40
	Min	-18.47	-17.11	-10.52	-6.10	-5.69	-4.70	-4.94	-3.65	-6.10
	Max	4.53	4.89	6.48	3.90	2.31	4.30	4.06	2.35	3.90
	SD	4.68	4.41	4.09	2.67	2.27	2.08	2.80	1.68	2.59
SIO bags	N	35	35	35	34	35	35	35	35	35
	Mean	-1.62	-.42	-4.18	-.13	.46	-.96	2.63	-.59	-.39
	Min	-18.47	-17.11	-16.52	-9.10	-6.69	-7.70	-11.94	-5.65	-5.10
	Max	5.53	6.89	7.48	3.90	2.31	4.30	4.06	2.35	3.90
	SD	5.80	5.48	5.25	3.31	2.73	2.56	2.93	1.89	2.27
SIO univ	N	30	29	30	30	30	30	30	29	30
	Mean	-2.91	-.14	.05	-.47	.38	-.03	.89	-.75	-.33
	Min	-18.47	-14.11	-8.52	-6.10	-4.69	-3.70	-5.94	-5.65	-6.10
	Max	5.53	6.89	7.48	3.90	2.31	3.30	4.06	2.35	4.90
	SD	5.65	5.01	4.38	2.94	1.89	1.95	2.42	1.84	2.66
A21 REC	N	35	35	35	35	35	35	35	35	35
	Mean	4.01	2.07	3.71	1.10	-.40	.21	-2.69	1.12	1.70
	Min	-4.47	-8.11	-3.52	-9.10	-7.69	-7.70	-8.94	-1.65	-4.10
	Max	5.53	6.89	7.48	3.90	2.31	4.30	4.06	2.35	5.90
	SD	2.53	4.44	3.19	2.71	2.20	2.88	3.46	1.17	2.30
All activities	N	198	197	197	195	197	196	198	197	198
	Mean	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Min	-18.47	-17.11	-16.52	-9.10	-9.69	-7.70	-11.94	-5.65	-6.10
	Max	5.53	6.89	7.48	3.90	2.31	4.30	4.06	2.35	5.90
	SD	5.25	4.84	4.90	3.05	2.53	2.39	3.93	1.84	2.81